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Submitting articles

Commodore Horizons welcomes readers' contributions — either articles or program listings. Articles should be typed double spaced with a wide margin. Programs should whenever possible, be printed out on plain white paper, accompanied by a cassette. We cannot guarantee to return every article or program submitted, so please keep a copy. If you want to have your program featured you must include an SAE.



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EDITORIAL

COMMODORE'S TWO NEW machines, the C16 and Plus/4, have been a long time coming. Originally announced at the CES show in Las Vegas in January, the new machines finally made their public debut at the UK at the Commodore show in June, though they were not available for sale until September.

The C16 is designed as a direct replacement for the long-serving Vic20, production of which has now ceased. With 16K RAM and 128 KROM, the C16 offers more memory than the Vic at the same price of £199.95. With enhanced graphics and sound capabilities, the C16 looks set to consolidate Commodore's presence in the low-end games market.

But, the Plus/4 is not meant to be a direct replacement for the ever-popular 64, though some users will undoubtedly be drawn between the two machines. The Plus/4's main distinguishing feature, as the name implies, is the suite of four integrated software packages — a word processor, spreadsheet, database and file manager. Applications, rather than games, provide the key note.

However, the Plus/4 integrated software has not met with universal acclaim. Admittedly, the four programs all reside in memory at the same time and have the ability to exchange information, but their usage appears to be limited. The spreadsheet can display information as a bar-chart, but not as a pie-chart. The word processor lacks right justification.

The Commodore 64 will undoubtedly continue to sell in quantity well into 1985 year, as will the new C16. Sales of the Plus/4 may be more problematical.

What must be worrying Commodore, however, is the question 'what comes next?' By the middle of 1985 the venerable 64 will be starting to show its age. Will Commodore attempt to replace it with a new machine, or will resources be left to choose between the more limited C16 or the applications-based Plus/4? And, to help Commodore concentrate its mind on the problem, Atari's shadow may be starting to loom larger by 1985 year.



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LETTERS PAGE

Poke poke

HERE ARE a few useful
keyboxed POKES to try out
on the unimproved 10.10
Some may be useful or
included in programs
POKE 630155 — key repeat
POKE 630156 — left key
repeat
POKE 761104 — lock
BLN+STOP key
POKE 606155 — left SAVE
function
POKE 19615 — Clears
keyboxed buffer
POKE 100000 — ROM
BLN+STOP / SAVEROM
POKE 377610 — lock
RIGHT 1961 key
POKE 100155 POKE 671155
— auto LOAD
PW 4 continuing
Continuum
Survey

***** again...

WITH REGARDS to Stuart
Powell's query over
Pokebox

The problem is solved by
'Extensive use', and about
your programme you will find
a key which will solve your
problem. As you said, I am

deserve another, could any
of your readers help me with
regards in the same Queue
I cannot get past the prompt
outside the bottom door of
the house without seeing
something first
I am lost for words
The magazine is a superb,
informative and interesting
read, keep up the good work
How about an Adventure
Center for the adventure
fans?
John Woods
West Hampstead
Wants

Basic error

I TRIED your Pokes as
described in the August
edition of the magazine for
moving the bottom of Basic
up in the ROM. They work
fine. Pokes, I found as for
Maxwell that, the either BLN
or MFW produced a
SYNTAX ERROR message

The suggestion of the Basic
RAM without the Pokes, I
discovered that address 300
contained zero. I thought
Poke was over the first
address of the Basic area after
moving the bottom of Basic
up with your Pokes, then
loaded in the Basic program
and the SYNTAX ERROR
message was no longer
produced

I can only think that if the
first line number of a
program can be controlled as
I hope, the first byte of the
Basic area is not zero filled,

but dropped over, it doesn't
have a ROM destination, so
I cannot check the accuracy
of the gates
I think you find this
information useful and
perhaps pass it on to the
Maxwell if she is still having
problems
Doreen McCarthy
Newport
North

Chort toppers

AS DISCUSSED by Ben
Averyman and Tim Lakin,
could you include a chart of
the bestselling Commodore
games in your excellent
magazine?

Also, could you suggest a
highscore space on
somewhere? I'd start by
giving my scores — 626993 on
Beverage of the Month
Carnet, 146200 on Break
Thru!
Dan Gander
Abingdon
Mid Devonshire
CAN anyone beat these
scores?

Kuhn Lin conquered

I HAVE just read Peter
Gordon's article on the 175
Gold game Break Thru in
September's *Microfun*. I am
glad to do all succeed in
destroying the fortress of
Kuhn Lin

He obviously built a
positioned enough. I successfully
gained success, the result
being that the mighty comets
blow apart and a whole flag
appears at the top waving
John Williams
Dorset
Wilt

...and again!

ON Pakebox the copyright
note very well hold the
word to mean the word!
Clear. The thing was! Look
out for Madhouse!
C P S
Dorset

Mastertronic

MASTERTRONIC has asked
us to point out that there is
no connection between our
Star Game for October, *RAM
Racer* by John Ship of Solar
Software and the
Mastertronic game of the
same name. Our apologies for
confusion by our print.
Mastertronic's is better

While we're at apology
mode, a note to readers trying
to type in Tony Radford's
Star Number — the
"13048 + 11" as in 1000 is a
glitch and should be ignored

This is the chance to add
your views — send
your tips, comments
and compliments to
Letters Page.
Commodore Horizons,
13-15 Little Newport
Street, London
WC2E 8LD



Modem mania mounts

WITH COMMODORE's Commodore Modem officially launched at the PCW show last month, several other companies have entered the modem market.

Pradex's 1200 modem is a standard RS232C device comes EPR40. An interface cable using D445 is needed for use with the 64. The software incorporates character remaps and 1800/1200 or 1200/75 baud rate software. Pradex and the subsidiary Microsoft service can be accessed using the modem, but the question of downloading software and accessing Compuserve has not yet been resolved.

Greater Circle Holdings, Park Lane, Borehamston, Herts, EN9 5JH.

Microdata's Theta 12M Desktop has announced the V2423 modem, suitable for Apple and IBM computers, but with versions for home users to follow. Contact The Sales Dept, Data Communications Division, Theta 12M Desktop, Spear Road, Fulham, Middlesex, SE6 9JF.

Lastly, London's 2084/V21 modem for 800-M or V21 2800-baud device coupled with software enabling the owner to be used as a "band" terminal. The unit is not compatible with Pradex, and does not have Telecom approval. Cost is £49.50. Contact Ianford, Unit 22, Penrhyn Industrial Estate, 8-10 Creechdale, London SW9, tel: 01-459 7947.



Pradex's 1200 modem

64 music — the key of life

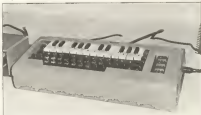
MUSICAL 64 owners will be pleased to see the release of a clip-on mechanical keyboard overlay for the machine. Commodore's Music Maker will cost £29.99. The system will include the keyboard, which sits over the top row, rows of QUERTY keys, keyboard stickers, cassette or disk software, and a music book.

Further software and book releases are planned. The initial program will allow sound synthesis using some of the facilities of the 68K chip, programming of rhythms and melodies, and electronic functions.

Music Maker will be available at the end of October, and we plan to carry a full review

in next month's issue.

A Commodore spokesman at the PCW show spoke of the possibilities of further 64 music developments which might allow connection of the music to other units, such as synthesizers and drum machines using the MIDI standard, though no firm details could be given at the stage.



Music Maker — clip-on keyboard with a host of software

Quicksilver attack

QUICKSILVER launched a massive attack on the Christmas game market on September 18, with a press conference attended by press, players and Charles and De launay.

The Mighty Thang, also called as the 11 comic 2800 AD, was there to cover the launch of Quicksilver Dog and the Death Cavalier. Johnny Alpha, the Quicksilver Dog, is a mutant heavily mutated (changed to regular) individuals in 2800 AD. The 64 game, one of a projected series, will cost £2.95.

3-D And Attack, which has sold 50,000 copies in its Spectrum version, has also been adapted for the 64. It features a revolutionary 3D-3D perspective graphics system, displaying a 3D picture of a city which you have to explore in order to have able to believe from surrounding area with 3D space will be £2.95.

See Sam in from the Hungarian Andromeda team,

and a strategy/casualty game in which you have to break the defense of a castle — £2.95 again.

Major Märs Mission is two games in one based on the opening credits of the Central TV series. In the first game you must land on an alien planet protected by robots, and in the

second you must penetrate the Major Märs to carry out operations in a mobile control — £2.95 again.

Quick-based software includes Quicksilver of the End Castle of Quicksilver. Both games, costing £10.95, are real-time interactive arcade adventures in which the hero, Maximilian the Warrior, is drawn deeper into the myths of the story as the game proceeds. The games are supported from Australian Software of Canada.

Quicksilver, an art utility program allowing either joy stick or keyboard. Cost: £4.95.

Finally, there's Hammer Games from York UK, an Oxygen simulation which stretches the graphics capabilities of the 64 to the limit. For the games series (p22) for a full review.

Reviews of the other games will follow soon.

Contact: Quicksilver at 13 Fulham Road, Southampton.



Quicksilver — 3-D Johnny Alpha

Virgin Games — who dares wins

VIRGIN Games will release a program based on cartoon hero *Don Darr* in the spring of next year.

The program is intended for the Commodore 64, as well as the Amstrad and MSX machines.

Don Darr, space-pilot hero of the Eagle comic, has recently become fashionable all over again with the release of *Diagby* by IPC and the replica of

of many of *Darr*'s early adventures in book form by Dragon's Head Press.

The Virgin game will probably be a multi-screen arcade adventure done in comic-book style, with speech bubbles. As the amount of details are available as to the price at the time of the game, but negotiations for copyrights have been completed. More details will be made available soon.



Practicorp thinks ahead

PRACTICORP, producer of the PS Programmable Spreadsheet and 64 Graphic programs, continued to produce more, has announced plans for an odd batch of releases.

The new programs include business and educational packages. *Practicole* is an adaptation from a successful word processor program *Practicore*. *Practicore* 44 and *Practicore* 5 are also on the way, and on the

educational games from there's 44 *Path*, *Star Wars*, *Jeopardy*, *Knows* and *Speller*. Total *Practicore* words like a version of 44 *Director* designed for human beings.

Full details of price and availability will be released shortly. Practicorp can now be contacted at Goldford Road, Warehouse Industrial Estate, Ipswich, Suffolk, IP4 2NF, phone 0475-40121.



Practicorp's full line-up

RS232 access eased

ACCESS Computer Co. of Stockport has developed a combined Serial interface and cable, allowing connection of RS232 printers to Commodore computers.

The LHM was supplied with simple instructions and allows the Epson 8300, P300 and FX100 printers to be used, along with many other models including Star, Shimadzu, the Brother 4PMM, and Selver Reed printers.

Contact The Computer Centre, 61 Shaw Heath, Stockport, Cheshire, 061-477 4013.



Access interface

Hugh's artistic winner

THE RESULTS of Commodore's International Art Competition were announced at a show at the Hayward Gallery on September 5.

The winner of the competition, which required artists to create a still or dynamic work of art on a 64 or 128, was Hugh Ray of Manchester. Hugh, with a £5000 redemption to study computer art in the country of his choice, plus £1000 worth of Commodore computer equipment.

The winning piece was a study of Hugh's baby son named "Louis (Mathematical Poets) 1207".

Prizes were in other age groups and categories included Ross Williams of Hereford, Richard Hadfield of Halesworth, Thomas Gossard of Aberdare and Joanne Driscoll of Blackpool.



Hugh's baby and his winning program



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... Number One For Choice...

This is a selection of some of the new 1984 software for the Commodore 64 which will be shipped in 1984. All the software is new, specially written for the Commodore 64, and is available in the UK. The Commodore 64 is the most popular computer in the world, and the Commodore 64 is the most popular computer in the world. The Commodore 64 is the most popular computer in the world, and the Commodore 64 is the most popular computer in the world.

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This is the most powerful music software available. You can create your own music, and you can play it back. The software is easy to use, and it is very powerful. It is the most powerful music software available.

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This is a very powerful music software. It is the most powerful music software available. It is the most powerful music software available.

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(Software) - cassette

This is a very powerful music software. It is the most powerful music software available. It is the most powerful music software available.

HS-64 ASSEMBLER £55

(Software) - cassette

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KOALAPAD £80*

(Software) - disk

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MICRO- SIMPLEX £178

(Software) - disk

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THE LAST ONE £37.50

(Software) - disk

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CODEWRITER £85

(Software) - disk

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(Software) - disk

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(Software) - disk

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(Software) - disk

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(Software) - disk

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SARGON II £145

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Stay cool. Stay low. Stay alive.



RIVER RAID

1-2 Players. Running on Commodore 64. Single Spectrum. Treat your usual software store.

You are commanding a squadron of four ground attack aircraft.

The mission is seemingly hopeless.

Fly along the river at zero altitude, twisting and turning craftily to stay within its tortuous banks, blasting at anything and everything in sight. Especially the bridges.

Three of your jets are held in reserve while you are pitched against Battleships, Enemy Aircraft, Land Tanks, Balloons, Helicopter Gunships. All intent only on your destruction.

And destroy you they will, if you don't get there first. You'll need to keep an eye on your fuel gauge. But take comfort, you can take fuel on board from one of the special depots.

If you get hit—and nobody has yet reached the end of the river—your next reserve starts at the last bridge you blasted on your way through!

Each target you destroy adds to your points score.

Like all Activision Software, River Raid will hold you and keep you coming back for more.

Check it away!

Lose yourself in the world of

 **ACTIVISION®**



Plus/4 — the verdict!

COMMODORE's new 64K machine is now making an entrance to the home micro arena where its predecessor has been so successful. So, how does it compare to the 64?

The first thing that strikes you about the Plus/4 is the size — or rather the lack of it. Instead of that rather cumbersome rounded box inherited from the VIC-20, the Plus/4 features a much smaller and sleeker MSX-style wedge-shaped design, which is far more visually attractive and places the keyboard closer to the disk top. The new section of the top provides ribbed ventilation slots and the unit remained cool and silent.

The appearance of the wedge keyboard is rather similar to that on the portable SX40, but the key tops are comfortably defined. It may not be quite as acceptable to some users as the 64's, as the keys are heavily spring-loaded and rather 'bouncy', but such features are rather a matter of personal taste. In a departure from Commodore tradition the cursor keys are placed away from the main keyboard in a diamond formation at the bottom right corner of the case, which makes cursor control much easier. Four dual-purpose FUNCTION KEYS are placed in a horizontal row at the top left of the keyboard.

Warm start

A power on light and switch are provided together with a RESET button. The RESET key normally acts in the same way as the power switch, giving a straight

forward cold start, but if the RUN STOP key is pressed during RESET a warm start to the machine mode indicator is made instead so you can often resurrect programs which 'hang-up'. We feel that this sequence should really have been reversed (ie a warm start by pressing the RESET key alone), as a rather too easy to accidentally produce an unwanted cold start.

All the I/O connectors are placed neatly along the back of the machine. The SERIAL (for disk drive and printer), VIDEO (for monitor), and TV sockets are identical to those on the 64, but the carrying port, user port, and physical ports are all totally different, using small 8-pin plugs. These socket changes are confusing as the standard C20 interface recorder and units cannot be plugged in. The power supply is the familiar 'hang' provided with

the 64, but with a different connector. An interesting addition to the row of sockets is a MEMORY EXPANSION port, promising even greater storage capacity, but there is no separate cartridge port and 64 cartridges are incompatible, so the connection differs. As usual on Commodore machines, the serial I/O does not use the industry standard RS232C voltage levels so an interface will be required for communicating peripherals, and communications.

Memory switching

On power up 'COMMODORE BASIC V3 5.000' BYTES FREE' appears at the top of the screen. The version number is a reflection of the improvements made to the BASIC since the 4K's V2 and the 64K's V3. In terms of memory density available through BASIC is a whole 37760 bytes (25K) more than that termed 'multiplexed' on the 64. Although both machines have 64K of RAM this memory is available is achieved by some new, successful memory switching routines (and we don't need to see if Commodore's TV ads will now feature a big wheel).

The Plus/4 retains the full screen editing features of the 64 but adds some useful extras, such as automatic insert and back skip characters, and the editor is more in agreement with the new cursor key arrangement. In usual Commodore fashion a wealth of different graphics characters are printed on the front of the keys but there are not obviously as definable



To keep up with the January 8 WINDOW facility has been included, although this is rather rudimentary, providing only a single window via ESCape sequences. The top right and bottom left corners of the window must be defined in terms of current cursor position, so including window settings in programs is rather messy. Other ESC facilities include automatic scroll, deletion of a whole line, turn off scrolling, reduce screen display (which may be necessary on some TVs) and scroll up and down.

The default settings of the function keys provide another copy of "GRAPHIC", "DIR", "DISCARD", "DIR", "DIRECTORY", "DIR", "SEARCH", "DIR", "SAVE", "DIR", "RUN", "DIR", "LIST", "DIR" and "HELP" (90) and in contrast to the system on the 84 the function keys can easily be redefined using the KEY command. The useful HELP facility assists in debugging BASIC programs. If an error comes to light during execution then pressing HELP displays the appropriate line with the statement causing highlighted as flashing characters. However LIST and then calling for HELP will resume the error in context.

Slow loading

The draft manual suggests that the cassette routines are similar to those of the 84, so we expect that it may still suffer the same problem of slow loading.

The Plotter option perfectly with the 844 Disk Drive, but inevitably a ceiling from the notoriously slow access time of the unit. The 1941 is to be replaced by the 8443 which promises faster execution times. The commands supplied on the 1941 drop directly off the list are not required on the Plotter, so the disk handling commands are all included in the ER ROM. These disk commands compare DRIVE, DIR, DIR, DIRECTORY, BACKUP, COPY, COLLECT, DISMOUNT, SCRATCH and HEADER, with TRON provided to trans-



one disk handling errors

BASIC V1.3 is a modest improvement on the real old BASIC V1, as Commodore has taken to heart the numerous complaints from users and included many of the better features of more modern BASICs. All commands available in the 84 are included together with a number of significant additions. Commands can be abbreviated and of course you can program the function keys to duplicate any desired sequence.

The extra non graphics and sound commands are as follows. AUTO provides automatic line numbering whilst EDITF removes program lines on request. Although Commodore has not gone the whole hog and provided a completely structured BASIC, the addition of DO/LOOP/WHILE /UNTIL/EXIT should go a long way towards appeasing the purist. BASIC V1.3 supports IF THEN ELSE rather than just the simple IF THEN, which makes for better programming. Modifiers to REMOTE now allow a line number to be specified from which to read DATA. External over-lapping routines are included to make input program routines available. TRAP traps all error conditions except "RUNTIME STATEMENT ERROR", and will re-run the program to a predefined line. Once an error has been trapped the given line number can be stored from the variable V1, with the error condition con-

tained in the ER variable. The function ERRCLR gives you the error message corresponding to ER.

PRINTING allows you to continue program execution after an error has been trapped. GOTO is a GOTO (or GOTO) statement which automatically waits for a key to be pressed instead of falling through BASIC commands from defined to undefined and features while END provides for routine conversion. The IFN function returns the value of a switch type joystick, but the ordinary standard 5 way D plug is not used. PRINT USING allows formatted PRINT outputs (such as columns of figures) to be produced with the minimum of effort, and PUTIF allows you to define the characters to be used as PRINT USING PRINT is a valuable addition to



the string handling commands providing searching for one word within another. TRON and TROFF are debugging commands which print the current line number on the screen during program execution, although these commands are often more trouble than they are worth as they upset the screen display.

The graphics commands are a strong point of BASIC V1.3 as they transform graphics programming from an awful art to a child's play. The GOTO and V1:

A major criticism of the software is that way that the screen display is used. Only 37 characters are shown across the screen, and the space that a line less than half the width of the document is visible in any one line. This makes reading the document difficult as you must pass theough the thing from one side to the other to follow a space through. Also it makes it difficult to play out the format of the final document. A phrase often used to describe some word processors is "what you see is what you get" meaning that the display on the screen can be set to show the document just as it will appear when printed out. No way can 3 PLUS 1 provide this.

On using the word processor I found a number of things not to my taste. The commands are generally overly clever or use, for example there is no text entry mode. You must use the INSERT=DEL key to give you a series of spaces or a special command to insert a blank line and then type in the space provided. Having the RETURN key can wipe out a whole line of text if you are not careful. When working with blocks of text, the text is not adequately marked on screen and hence it is easy to make mistakes.

The second program prints a

Software on trial

THE PLUS 1 has been designed as a market leading computer system intended to maintain and, if possible, improve Commodore's position in the market place. An integral part of the system is a software package provided with the machine and held on ROM for user access use.

Named 3 PLUS 1 the software provides facilities for word-processing, spreadsheets, filing, spreadsheet operations, and drawing of simple graphs. The package is not a sophisticated one and does not offer the facilities of more dedicated programs in each of these fields. However, this is the first time that such a package has been made available for a mass-production computer aimed at the home or business user at this price.

So called integrated software packages use the facilities of the machine as the highly computerised market of business software for machines such as the IBM PC. Commodore has achieved several points in the integration status. The 3 PLUS 1 software is integrated into the machine itself, the programs share many of the same commands, data can be transferred from

one program to another, facilities from two or more of the programs can be combined to do things like creating mail-shots, and the programs with data can all be 'saved' on the machine at one time.

When you install the 3 PLUS 1 you are started off in the word processor. The working area available on you is 37 characters wide by 19 lines deep. Most of the standard facilities are provided including text entry from the keyboard (obviously) deletion and insertion of text as you point on the work area, copying or moving blocks of text, and formatting through the use of substitution settings, word wrapping (the automatically ensure that words are not split at the end of lines), justification by spacing words is completely left hand control of the printed output.

In practical terms the documents which can be produced must be relatively short. Letters can be produced and, when used in combination with the data base, or tables or mail-shots are possible. It would be over-ambitious to attempt to write books or lengthy articles.

11 spreadsheet: What is my least favorable program of the time. The program of a spreadsheet is to provide a grid into which numbers, formulas, and text can be placed and manipulated. The value of a spreadsheet stems from the ease of entering the thing you are manipulating data and, for many practical applications, the ease of the grid provided. Spreadsheet has had to cut some corners with this program in terms of the way in which formulas are processed and the ease of the spreadsheet itself.

A grid of 30 rows and 17 columns is provided, which is adequate for many uses, but no additional limitation is imposed by the memory allocation limitation. It is allowed the other programs space in memory at the same time which can mean that only half the grid spaces can actually be filled. The screen display is currently set to show 12 rows and 5 columns. A half height display is also good 7 rows deep, to permit both mixed processing and spreadsheet to be shown on the same screen.

Each space on cell, on the grid may contain a number and only this information or a formula. Any formula which contains reference to other cells, unless explicitly by the cell row and column numbers or by the row held on the cell. It is seen that Commodore has chosen to spare most of the other spreads here by using an unusual method of referring to cells by row/column and column numbers. See the following

reference. It is more normal to refer to someone's wife using letters to signify the element. Also, in making a move to build up the spreadsheet, a formula is usually included which copies a single formula to a number of other cells which automatically convert the formula for each cell. Comshare has not provided such a facility.

Data from a single row of the spreadsheet can be used to create a simple block graph and transferred to the word processor. No comparison to form 139, but even simple graphs can have their uses.

Graphs are produced in low resolution in all graphics devices to standard process. Automatic scaling is used to produce a graph 20 characters high but the scaling cannot accommodate unusual values.

Low and at my department most useful course is distance programs. Even when the program is relatively unimproved, but is very functional despite that. However the programs cannot be used without a disk drive.

Up to 999 records (think of each record as a card in an index) that can be set up to form a file on a disk. These set up, the records can be modified, sorted, printed, searched, and the records can be used to properly store the data with the word documents.

The most difficult operation is the initial setting up of the data file. You must specify

what type of data is required, no matter how small, and how much space must be provided for each step of data. This information can be changed once set up and so you must be sure of exactly what you want before you start to set up the data. After doing this, the rest is relatively easy. Alphabetical sorting is reasonably fast, so is searching the whole file for a particular area of data.

All the 3-PLUS I programs are designed to be used with a disk drive. This obviously will increase the cost of a full system. The data base is dependent on a disk drive in use as well.

A separate manual is provided for **APPENDIX**. This provides a tutorial approach to introducing the programs, as well as reference sections. Each function is individually described with the help of examples.

In summary, if you are thinking of getting a PLILite4 just for the sake of the software, then forget it. You can get much better value elsewhere. As an add-on to a potentially good general purpose microcomputer it is of great value. If you want to leave the basis of using three types of workshop programs, but have an immediate good place for their use, then the PLILite4 system is well worth further consideration.

Abstract

■ chips of the 64 have disappeared almost entirely but all that follows, PEOCling is a thing of the past, having been replaced by a graphics system comparable to that of the Microsoft Windows Color Base used by the Tandy CoCo, Dragon and new MLK computers.

Place different GRAPHIC models on the screen. The default mode is portrait, a standard 24 lines by 80-column text display. Two screens of data of the two models shown in FIG. of RAM. Mode 1 provides a full screen 240x160 pixel display with the full range of values subject to the constraints of only one thousand entries per character space. Mode 2 halves the horizontal resolution but allows three full screen displays of each character space.

Figure 6

Minors 2 and 4 are similar to minors 1 and 3, except that the screen is open and returns the full set of text of the column. 07158

allows you to print a wiring of characters anywhere in any mode, providing useful knowledge of text and its position. **COLOR** accepts any of 16 colors and luminance settings to either the background, any of up to three foregrounds, or the border. **BOX** allows you to draw filled and empty boxes, which can be colored about the center, and the very powerful **CIRCLE** command allows you to draw anything from a simple circle, through almost to a triangle defined in 21 degrees. **SCALE** produces a straight line between two points and can be used to produce a whole shape (although not as simply as we'd like to do it). **SCALE** command.

LOCATE places the cursor in any screen coordinate and **SCALE** shows the screen coordinate system to be changed. **PAINT** fills defined parts of the screen with particular colors. **SHAPE** and **CORNER** allow blocks of the screen to be pushed up and down, thus, no influence on the stored data.

being either true or wrong the idea of the main axiom is much more restricted than with the earlier Microsoft CBIT and SPIC commands. The RUCOT language provides the X and Y coordinates of the origin and can also return what is known as the count. RUCOT returns the current graphics mode, and ALLINE the homogeneity level of a space. The code: All the graphics commands can be specified in absolute terms, or relative to the origin.

Self-employment

One excellent feature of the 44 which has gone to the sports capability — although dealing with sports was so painful that most people never bothered with them anyway! Consideration of the standard of 44 at present scarcely being produced of the humble Spectrum leads us to believe that sport game programmers will find this a welcome change of scene.

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compared with the brilliant effects possible on the 64, but even again it is much easier to access and it will put many other home movies to shame. The sound is routed through the TV speaker, and is controlled internally via the VOLUME command which provides seven levels (with a default level of zero — which is why we began to wonder whether the sound channel on our monitor was working!).

White noise

SOUNDING consists of two voices available, the second of which can produce both notes and white noise. Envelopes are not supported and only the notes' name and duration of the note can be specified, although Commodore do give a table of musical note frequencies (which regrettably requires absolute values).

Although SID and VIC may be dead TED has arrived, in the form of the built-in TEDMON which provides a straightforward assembly, disassembly and machine code monitor (which is inevitably somewhat limited in its scope, although adequate for dealing with small sections of code). The only feature really missed is a trace facility, allowing you to step through your program searching for bugs. However, instant access is definitely a plus point which should lead more users to widen their programming experience into machine code.

Although the Plus/4 is now ready for launch in the UK, Commodore has been dragging its heels somewhat, because of delays in completion of the built-in software packages, so it will be the new year



before it is available in volume. There has been much speculation over the market penetration of the Plus/4 and the 64 because they are both at roughly the same price band. Although many people expected that the Plus/4 would be simply a replacement for the 64, it is becoming apparent that this is not true, and that Commodore is aiming at rather different types of user.

Commodore sees the 64 continuing as essentially a games machine, with the Plus/4 appealing more to the 'serious' home user, who is interested in programming. The Plus/4 runs the seven 700K CPU models of the 6500, but any machine is

speed this brings is eaten up by the restrictions on BASIC and memory swapping, so retaining the standard PCW Benchmark as the benchmark produced effectively the same score. The Plus/4 User Guide was seen only in draft form, but promised to be an improvement on the 64 User Guide, as it contained much of the useful information previously restricted to the Programmer Reference Guide.

Our overall impression of the Plus/4 was that it was well-conceived, more user-oriented, and it marked improvement over the 64 in many other respects. The price of £200 seems rather steep (as production costs cannot be much different from those of the 64), but more software must be made for the new platform. It is possible that Commodore is deliberately inflating the price to clearly differentiate it from the 64 and leave room for manufacturers — just remember how much the 64 cost when it was first announced.

Outside competition


Of the outside competitors, the QL and Amstrad have much faster BASIC, are infinitely more advanced, and seem to offer better value-for-money, although perhaps a small war has in global terms. The BBC machines have a similar level of speed, offer compatibility, but are rather an unknown quantity. How well the Plus/4 fares against the competition will probably depend on which we brand loyalty and availability on anything else. ■

Keith & Steven Brail

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SEPTEMBER 1985 Computer 51

AFTER years of memories about its death, the VIC20 is now officially obsolete, replaced by the Commodore C16.

The C16 comes on a slimmer pack, similar to the VIC, consisting of dedicated circuit to disk—Introductions to BASIC, and four software packages, for \$199.99. The 16 in the name refers to the speed RAM available, though like the 64 the amount of real RAM is considerably less.

It looks just like any other Commodore machine, in the same case as its predecessors, though in a different color scheme—the case is dark grey and the keys light grey. The keyboard itself is the usual C164 type of thing, with device keys, not angled though the layout is not standard, very comparable to its predecessors. If you're got used to the patterns of keys like \square , \square , \square , \square and the all important cursor keys on the left, then you will have gone for a C16, as there's all changed round. I find C164 keyboards a little too soft, but typing is a personal thing.

Inside the box is a standard reset board, fitting quite a bit of empty space. The American status of the machine are immediately apparent by the metal mounting all over the inside lined. In the USA, there are certain legal requirements for radio interference, but there are no such laws in the UK, so British models usually



Commodore have killed that piece of the market stone dead and made good using Sonnet components, as BASIC version 1.3 is supplied with the machine, which has all the extra commands you would expect on any other machine.

The BASIC sits in 12K of ROM, along with the kernel, which loads after the disk is made to, and a machine code monitor. The BASIC is Microsoft's port of version, but is the funny Commodore dialect and before. Programs are edited using the same screen editor as before, but with the addition of a few welcome features such as automatic insert mode. The same PET type graphics characters are available, and the machine keys are initially configured to produce window key sequences. The default

the 'window' commands. Windows are one of the things of the moment, and first appeared on the Amstrad and QL, and now for C16. However, you can have only one window at a time, so it's not really as good as the others mentioned. I believe a window often can be obtained on the C64 by POKEing away. Regrettably there is no WINDOW command, so the process of defining a window has to be done by a tedious sequence of control code printing.

The C16 has five graphics modes. The simplest is Text mode, with the usual 40 by 25 lines of text, with each letter able to be a different color. This is the only one that doesn't take up the entire 12K of memory. In color mode, there are 11 different colors, each with 4 levels of luminance, and each, effectively giving 33 different shades, all



of which can be displayed at once. There are also two high-res modes, one with 4 lines of text at the bottom of the screen, and one without. In high res the resolution

Sweet little 16

stems on the average rules in the same room. There are few competitors to it, the main ones being the T80 prototype and the custom chip that does the clever stuff like producing a TV display. The T80 is just another Commodore version of the standard 6502, like the 6510 in the 64.

On the C64 with its 12K of memory, when you switch on you get a message saying something like '12K bytes free'. The remaining 10K is used up by the system, so about 40% is available in BASIC. On the C16 with 16K Basic you get about 12K free, which isn't bad. However, the machine you select one of the highest graphics modes, another 10K of memory goes down the drain, leaving you under 1K free RAM—less even than the VIC20. This is lost in the output stream of the C16—the bulk of RAM. On the 16K Spectrum, about 1K is left to the user, which is quite ample for many uses, but dropping a 10K screen for a machine that has on 16K is a proper oversight by Commodore. It's supposed to be technically possible to expand it up to a 320K and onwards on 128K, but Commodore don't have any plans for doing this themselves yet.

Previous hallmark

It has been the hallmark of previous C64 machines that the BASIC didn't support any of the machine's nice features such as graphics and sound. It probably made it a necessity to buy one of the many 'extended BASICs', either Sonnet's BASIC from Commodore themselves, or one of the independent programs. Well, on the C16

commands are a little at large, being mainly concerned with the disk drive, and in most ways would not have a disk drive. In the supplied cassette recorder they need to add others. Anyway if you don't like them, the KEY command redefines them to be anything else — not FORN necessary on the C16. For entering programs there are a few other commands like AUTO and MENU which are again new to C64 owners. Parts of extended programming will not be supported, as only such features being GO WHILE and GO UNTIL, with no procedures or long functions.

By pressing the ESC key followed by another, various BASIC functions can be avoided, the most interesting, or useful, as

is 320 by 200 which is about average nowadays, though there is a color restriction — you can only have two colors in one full pixel character square, the same as the Spectrum. However you can also have 120 different colors in one. The two remaining modes are 'high color' modes, which have a resolution of 160 by 200, but can have up to four different colors per character square, all with the choice of 127 colors.

Missing features

The main feature missing on the C16 compared with the 64 is sprites. Undoubtedly the best feature of the 64, but it is a little more costly and fewer in a row



games, as the programmer didn't have to bother about the mechanics of actually putting shapes onto the screen and removing them later, since the hardware did it all. The emphasis of speed on the C18 is a sad loss, and it may make it harder to write quality games for it. The Spectrum programs show that attribute problems can be overcome by skillful software, but it has taken a few years to work it out. How fast it will be worked out on the C18 remains to be seen.

Graphics control

Controlling the graphics from BASIC is easy with commands like DRAW, LOCATE, BOX, CIRCLE and PAINT. The Circle command doesn't just draw circles, but can produce oval, arc, or any kind of polygon. The CHAR command is a sort of PRINT &T command, that works in any graphics mode, and PAINT is a way of filling an area with solid colours. The speed of the graphics generally, and especially the filling, is positively stolid, and the BASIC mode is a little slower than previous C180 models.

The sound facilities of the C18 are not half as good as the 64s, but not much less adequate. There are two voices, one for notes, and one for notes or notes, with overall volume control. It may have more features, but they are not accessible from BASIC, and as the Programmer's Reference Guide has not yet appeared, I can't say. As it goes good through the TV, volume is not a problem.

The built-in machine-code monitor is not much better, but it's better than

nothing. It has a one line assembly, disassembler, and various memory read and write modes, though it doesn't have single stepping. It seems to have side wires & load commands via the cassette recorder, not disk, but I can't be sure as I had no opportunities at all for the machine.

The C18 comes with no new dedicated cassette recorder, which seems to be the same as the usual one, except that it has a different plug. The tape format is similar to beta, so the market for tape loaders remains for the C18. It also seems to be automatically drive IMI disk drive, but also supports a new disk drive, and to be four times faster. The BASIC has various commands to control the disk drive, including various loading procedures, and a DELETE/FORMAT command, and file transfer facilities as a substitute on a Commodore.

As with Sinclair's QL, the 'popular' markets are the C18 are something of a loss by Commodore. Instead of the usual Atari-type market, it is geared with two groups looking after DIN type markets, so you

can't actually plug anything into them except Commodore's own for business 'super controllers'. They aren't much different to the normal way of the well switched coin, so getting obscure software on the C18 seems to be just a way of selling more ports.

The documentation supplied with the review machine was very much per release, consisting of a couple of hundred photocopied sheets. What was there was good, though some of the things were missing. The C18 will be supplied in a 'starter pack' with four cassettes, but these too were unavailable for review.

The C18 is basically a VICE with a better display and more RAM, though what using graphics a number seems to be to the user. It compares directly with the 486 Spectrum and the 64. Its advantages include the supplied cassette recorder, good keyboard and better graphics, while its disadvantages are the small amount of RAM and uncertain software support. Conversions from the C18 are going to take time, because of the lack of agree and internal user RAM, through VICE conversions will be easier. It can be no way be thought of as a replacement for the 64, though if it had 128 KRAM more than it would be a serious contender. As it stands it does not have enough RAM for much programming, though Commodore's marketing muscle will probably ensure that a lot of C18s will find their way into schools next year. ■

Andy Pennell



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AUTHOR - PAUL BLINN

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Some useful DATA for the 1520

18-year-old Sarah Cotton tackles some problems she's encountered in using the 1520 printer/ploter and the use of DATA statements in programming

THE 1520 printer/ploter (for use with the Commodore 64 or VXL 25, is one of the cheapest and most versatile of the Commodore machines, chiefly designed at the home user market. In this article I have, among other things, tried to set down several of its capabilities in a simple way as possible.

It is assumed throughout that the printer is set at device 8 (although some may be at device 9). If you experienced any "device not present" errors by setting the module number of the OPEN statements to 8.

Simple

Let's begin with a simple program which will get the printer/ploter to print out your name. It is assumed that the paper is correctly inserted.

Run the program to make yourself that a work.

Line 10 tells the computer that you want to talk to the 1520, indicated by the device number which is called the device number. The first number is the file number which can be anything from 0 to 255. The last digit tells the computer the particular file you want this file to do. Here the 0 tells it that you want to print characters.

What you refer to the 1 again in line 40 the computer knows that this file is to be used for printing characters and accordingly.

Line 50 finishes the program by closing the file.

Let us develop our original program by adding the lines in Program 2.

Line 10 opens up another file, the one called 2. The last 2 tells the computer that it is to be used for changing values.

Line 20 actually performs this task. The 2 tells the computer not to go to change the pen colour and 1 is the code number of line. The numbers for the other colours are given in the 1520 manual.

File numbers

By changing the file number in the program and check that you understand the principles of using them. Remember that you will always have to change the number in the PRINT statements.

You can suggest, and alter the way the printer writes out your name. Change the characters due by adding the lines in Program 3.

The numbers for the other character sets are given in the manual.

Program 1

```
10 OPEN#1,4,0
40 PRINT#1, "YOUR NAME"
50 CLOSE#1
```

Program 2

```
30 OPEN#1,4,3
30 PRINT#1, "2"
70 CLOSE#1
```

Program 3

```
15 OPEN#1,4,3
25 PRINT#1, "1"
30 CLOSE#1
```

Program 4

```
OPEN#1,4,8
CLOSE#1
L38T
CLOSE#1
```



With a little help from the manual you could change to lower case ASCII's and PRINT "5" or change the characters OPEN 4,4,4 PRINT "4" or the longer to close the files at the end of the program.

Listings

Let's say you have just written an exciting and original poem for Commodore Macintosh and now want to get a copy on paper "what do you do?" Listing one programs us the poem's story, although not exactly first especially if they are really long. But do not despair — the quality is very good.

Write or load up a program with your computer and then open in the file, as program 4. Unfortunately the 1500 custom port and the normal control characters used by the computer — all has its own special characters. These are shown in the manual.

On to the 1500's plotting capabilities. You can think of the paper as your printer as a piece of graph paper. When you write in on the origin, 0,0 is at the position where the pen is up. See figure 3.

From the origin you can go up 400 steps down 800 and across 400 each step being 1/8 inch. Points are given using an X,Y coordinate relative to the origin. Type in and try program 5.

Obviously you will want to draw much faster pictures, but you could find yourself cutting off the top of the paper. You can overcome this in two ways — either by using the paper first before running the program or, much better, by actually including a line to do this. Try program 6.

Notice that if you change the position of the origin you have to use point "X" -1, to move and "Y" -1, to move.

The calculations on both all the programs were held in data statements, but this is not the only method for plotting. If you want to draw the graph of $y = x^2 + 10$ the program will take the fun of doing

Open file: Name your data paper
For "X" 1 to 400 "Y" = $X^2 + 10$ Draw to (X,Y)
Next X
Close file

You will notice that many of the 1500 programs I've given under the use of DATA statements. Let's get on now to look at this useful programming tool, which has applications in *many* types of programs including those requiring control of screen graphics and string handling.

DATA statements

In data statements, along with the related terms of *lines* and *lines* is one of the most versatile parts of Basic. It is used when several unrelated numbers or words are required to be held in the program and keeping them directly into memory is not a pleasant prospect.

The short program number 7 should help you to understand how the data statements work.

Let's look at the numbers and the word in the DATA statements, and place each in a separate variable. ▶

Program 3

```
10 OPEN10,4,1:REM OPEN PLOTTING FILE
20 PRINT#11,"H":REM MOVE TO ORIGIN
30 PRINT#11,"H":0,0:REM MOVE TO POSITION
40 FOR T=1 TO 4
50 REACH,Y
60 PRINT#11,"0":X,Y:REM DRAW TO POINTS 0
70 EN IN DATA STATEMENTS
80 NEXT T
90 CLOSE 11
100 DATA 40,10,40,10,20,0,20
```

Program 4

```
10 OPEN9,4,1
20 PRINT#9,"H":REM MOVE TO ORIGIN
30 PRINT#9,"H":0,0:REM MOVE DOWN 200
40 STEP 5
50 PRINT#9,"I":REM SET (0,-200) AS NEW 0
60 REACH
70 PRINT#9,"R":20,0:REM MOVE TO POSITION
80 (20,0) RELATIVE TO NEW ORIGIN
90 FOR T=1 TO 3
10 REACH,Y
11 PRINT#9,"J":X,Y:REM DRAW TO POINT REL
12 ATIVE TO NEW ORIGIN
13 NEXT T
140 CLOSE 9
150 DATA 120,0,150,200,20,0
```

Program 5



Program 7

```
10 REACH,Y,20
20 PRINT#11,Y,20
30 RESTORE
40 GET#10
50 DATA 12,4,HELLO
```

```
0 POKE35870,10
10 FOR X=1 TO 20
20 REACH,X
30 FOR Y=1 TO 10
40 POKE35870,X
50 NEXT Y
60 NEXT X
70 NEXT X
80 POKE35870,0:POKE35870,0:END
90 DATA 10,140,0,234,20,200,1,130,50,240
100 DATA 40,230,20,120,60,177,10,160,30,1
110 DATA 20,130,70,240,50,211,60,134,0,20
120 DATA 10,135,50,167,70,150,50,133,60,1
130
```


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The Potty Programmer

From *Alligato* to *Granfin Graphics*, Tony Crowther has blown a trail of original and highly playable games. Chris Jenkins pins down the man behind *Potty Pigeon* and *Misty Mate*

TONY CROWTHER says he wants to be famous, and he's going the right way about it. His games for Alligato and recently Granfin Graphics have set new standards for playability, graphics and sound, and characters like *Misty Mate* and *Potty Pigeon* are following on from the success of the earlier *Blagger*, *Loose and Killer West*. Not the financial rewards of being a programming superstar being with them the complexities of contractual juggling and jostling.

"I just don't get a penny for the games I write for Alligato — I regard a reward as a gift, and, in all the excitement I take in making them out of the dozens more that I only get royalties for my Alligato games while I worked for the company. Now that I've moved to Granfin Graphics I won't be getting anything."

Tony's programming career started in educational software — "I'd used a BBC in school, and bought myself a Vic and taught myself programming. This was when I was 16. I went through Basic programming and then taught myself machine code using computer-based assemblies — I couldn't work out what I was doing some of the time, but it was working!"



Misty Mate is going underground

Tony's first six games for Alligato — "I'm not proud of them!" — included *Badman Bazaar*, *Damned*, *Loose and Killer West*, *Loose and Killer West*, *Loose and Killer West*, and *Loose and Killer West*. "They were really crummy programs. Alligato's first release, and when I wrote them I was working from home and getting a royalty, but later I went up to write them."

Tony's first big success was *Blagger*, using some of the ideas of *Mad Max*. With Tony's distinctive style, however, *Blagger* came across as far more than an MMF rip-off, though it was Alligato's idea to produce the game. "The program I'm working on now is joint efforts between myself and Granfin, who offered me \$10,000 for *Potty the Potty Pigeon*. I wrote *Picky* in all the depression on leaving Alligato, and Granfin offered me a directorship as well as the advance on the game."

Secrets

Granfin's managing director is Geoff Brown, who also runs Commodore/US Gold. Geoff contacted Tony after seeing his Alligato games, and Tony, who was a regular at Granfin's Sheffield computer shop Fast Mart, gave works exclusively for Granfin.

But just what is it about Tony Crowther's games that makes them special? So far the distinctive large colourful graphics and smooth scrolling effects have made such games easy to recognise as a Crowther effort — but as Tony explained, this may soon change. "There isn't anything secret about the programming techniques I just use them and create a full screen with as much detail as possible. The last bit is in *Smash Tapes*, which is due out at Granfin. The screen only took about a week to do, and I dropped it while I was on holiday in Spain. Instead of using the 16 bit screen which forces when you try to scroll it, I just define 128 characters and build the screen up using those. It's a lot more clever to get smooth scrolling."

Scrolling

The heart of Tony's programs is a screen scrolling routine with a character set and after getting the boring bits out of the way he can move to play the game.

With *Potty Pigeon* I didn't have any idea what I was going to do, then I saw



Tony Crowther — "I wrote the first three then Alligato's *Fortified Prison*. There are three layers to the background, which move at different speeds so I used that idea, and the theme I worked out with my girlfriend

Misty Mate

"*Misty Mate* is similar to *Loose and Blagger* — the same type of world but a lot faster. Undoubtedly there were problems with the first batch because the tape duplicators couldn't get the *Pickles* to work so they changed the program. Then, corrected the characters set so that there weren't any. As in the program, then they duplicated 5000 copies before anyone noticed. Sometimes a reader, and a more than one — it was a real game, but from now on I'm making sure to check the duplicating model."

Perhaps Tony's first Granfin program *Misty Mate* moved successfully. It was near due to its longer in check, references to the screen work. The program was the idea of Granfin's Ian Brown, and the original version was by Pete Harvey for the Spectrum. We looked at that and decided we wanted to do things that you couldn't do on the Spectrum, like I'm sure being processed randomly every time, so my version for the 64 has some similarities but a lot of differences, you only get one life, the highest score you can get 999, and so on."



was a major role in getting on TV — First Starburst had a video, so we put a story in the local paper, and the first thing we were being phoned up by the national papers and the TV people. I was at home so I missed it all — but it would have been me if they'd known that my grandpa was the President of the Club Board!"

In Tony's "crazy" games, with a large playing field with swirling backgrounds and fast action combined with original characters, have been a big success. And does he intend to carry on doing that sort of game? "No — I've done enough of that — I'd like to do a really good shoot 'em up" Bubble Express, the latest Commando game, is the same sort of idea as Loco, but it's four more boats and the graphics are better than anything I've done before.

Tony's version of UK software on a very high — "Everything seems to be a copy. Loco is actually based on an arcade game called Super Locomotive, but I only saw that once and I wrote the game a year later so it's not a direct copy. I look at American software sometimes and get some ideas. The reason for my games is sometimes transferred from them, some sometimes written by a friend — I get him to do the first bubble ship game for Loco, but as it turned out it wasn't what I thought it was,

which the Bubble Ship I, was much more wanted was Bubble for the Yellow Mark Commander, which is what those have on. I've transferred from these made, it's a big piece from Sky 2."

Director

Tony's games should now be heading in a new direction. Having moved the stars from his Atlantic games and come up with even better versions for Gemini, he's now keen to go into new areas. For a start he has to think about the rules as a director of Creative Computer. "I'm the only one that draws a wage, because all the others have other companies backing them. I get a wage for each money sold and a percentage of the company's profits. When Bubble Express starts selling well there should be a fair bit coming in."

Tony's next project is connected with the Red Arrows RAF display team. "They've asked us to write a program — they asked Commander Lee, and they wrote back with some ideas. But I just laughed at it. Finally, it they put with the stars — I've got to figure out a way to make it with a game. It's got to be really well thought out, because it could just end up looking like a newsworthy for the Red Arrows."

Tony's "10" Edge Art and "10" Edge Technical Drawing qualifications on display help in the design of the games, which look as subtle details enter like cartoons than computer games. "There's only Asterix's Peak, on the BBC. That game you get a real feeling of various quality — that's not do the way they show black markers around the characters. With my details, it's really too small to do that. I'm doing some work on the BBC now, but really I don't rate any machines except the Commodore 64. It's so easy to make do. I can put in back and do a 100 per cent in a day, and the BBC's poor, but who uses Radio? Aside from that there's nothing against it. I could write any Spectrum game I've seen on the Commodore."

Realism

So while he's not MSX, and is working on the BBC, Tony's main effort should continue to be on the 64 — which is good news for all Commodore games players.

After the Red Arrows project, Tony's plans might include a game based on the Ray Harryhausen Film Club of the Titans, in which mythological figures battle to the death. The components of writing any adventure don't have much appeal with most — "It does get slightly tedious, having people raving you up along. How do I put that out? — I'm getting the same thing with Bubble Mole. Another thing I've done is to design the secret screens, the Bubble Express, and we've had an award from it. I've seen the Plus+ and thought it's got as good as the keyboard, you could write a secret screen for it, but I think I'd like to write more for the Club. A lot of people get it, and it's enough to write a good game on — a lot of Atari cartridges like Bubble King and Pals Paradise are on the 64, and the only Ultimate games for the Spectrum. There's plenty you can do on the 64 — like a good chess 'em up?" Tony continues, returning to a favourite theme.

Motivated

Tony's last working on a book on programming hints for the 64. "It's got some hints in it, but it's largely going to be for machine code — things like screen scrolling, associated characters, machine state, rotations, playing sounds using interrupts, that sort of thing — it might put me out of business! We're looking at several possibilities" But why were a book now? "I found I'm enjoying it, getting reviewed in the magazines and getting my name in print. It's not the money that I'm after — I haven't got a Mercedes, I can't even drive, but I've got a good contact with Creative, and a copy-book full of names of my pattern. Everyone at Sheffield knows me, though I don't get invited to open supermarkets now. Gemini's going into the American market through UK Gold. Jeff Brown's taken up to US Gold, and we're all working together to come up with new ideas."

"I wish a little company with me as head of it in Spain, and it's full of ideas."

It should be interesting to see what springs forth from Tony's little company then! ■

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HAVING BOUGHT your 64, chances are that at some time or other you will find yourself parking with more of your head turned aside for a joystick. When that reflexes are needed to play some arcade games, it's much much easier to press a button or push the stick in the required direction than search a keyboard for that fabled "W" for up, "A" for left etc. Possession of one of these little gadgets will also enable you to use it as your own program, and if used in its full extent, you can eliminate touching the keyboard at all.

Having said this, we need to know how to incorporate a joystick routine into our programs. A quick look at the Commodore User Manual reveals absolutely nothing! What we need is to have a routine in our main program to check values held in BIT0-BIT5 with the joystick in part 2 (BIT0 for part 1). The first five BITS of BIT0-BIT5 are used to detect joystick movement.

Activity

If you type in the Extended Joystick Demo Program, leaving out the REMs if you wish, then this will show exactly what is going on inside the computer when you move the joystick. A chart is displayed at the top of the screen, which contains the activity at the address.

The second row on the chart shows that with the joystick in certain positions BITS 0-5 are turned on. The top row gives the decimal value for each BIT. The third row displays the BINARY value by changing to a ONE when the BIT is turned on and ZERO when it is off. The BIT number is shown on the bottom row. Just underneath the chart gives us the format as to what is on our IF-THEN statements with the decimal value for each direction as well as the five buttons.

This format may be used in all of our IF-THEN statements, which we will need to use to determine in which joystick direction has been used, and what we are going to do about it. The demo program, however, PEEKs address 1000 only once, so line 500. The computer then moves that value in the variable % and takes the appropriate action from one of the new IF-THEN statement lines.

Address

Now by moving the joystick and pressing the fire button. You will see the BITS turning on and off and the binary and decimal values changing. By adding together the decimal values of all the BITS which are turned ON, we will arrive at the BYTE value held at the address. With most modern joysticks there are a total of eighteen different combinations that we can use. The activation of the joystick at the bottom of the screen gives this by logging a total of eighteen different objects. For the different combinations of movement and firing. This is only a simple demonstration, but shows that we can make an excellent character perform eighteen different tasks. For instance, our character could be, say, a cowboy who walks left when we move the stick left, fire a gun while walking left when we press fire at the same time. If we

PROGRAMMING

An ode to joy-sticks

Frank Atkey's novel demo program shows you how to exploit your 64's joystick routines

move the stick diagonally up and left) and fire, then he could throw a laser ray, etc.

Needless to say, any of the IF-THEN statements need be used. If we only wanted to move left, right, up, down and fire then only the first five lines from 100-150 of the demo program would be used. Inclusion of all of the eighteen IF-THEN statements in an arcade game is there would probably be considerably done in some instances.

Ability

After you have studied the effects that the joystick movement has on the chart on the screen, we can experiment a little by modifying the program slightly to be able to move the juggle about the screen. First delete lines 100-150 in the demo program. Now alter lines 110-190 as shown in Figure one, not forgetting to add line 695. Now use the new version of our program before running. Many experienced programmers know about the joys of running an untested program! Now when we move the joystick — "Woo Peewee" our juggle moves about the screen in any one of eighteen different directions. Because of

the fact that the computer is still going through a lengthy routine at 1000 to update the chart display, movement is not very fast. This is why X and Y are incremented or decremented by one pixel rather than the other several and smoother one. For example, try moving the joystick to a higher figure. Note that when the fire button is pressed with the joystick in the up-right position, the screen will change to a random colour.

Advantages

This is not the shortest routine to move a sprite around the screen, but it does have the advantage that we have at least another eight or more options open to us. For instance, try moving the joystick in any direction and press the fire button at the same time. Nothing happens. Our juggle doesn't even move. A look at the chart at the top of the screen will show that several BITS are turned off, and the total decimal value adds up to a figure not entered for in our IF-THEN statements. We deleted them as lines 100-150.

Now, as a final experiment, type in the moving lines 100-150 but add your own comments, like making the border change colour or perhaps make a different sound for each direction of the fire button as pressed simultaneously. The more advantages may even make the juggle a different colour or make him disappear!

This then will give you some idea of how to use a joystick in your own programs. It's not the only way, but probably the simplest and more accurate way to do it. Remember, inclusion of a joystick routine in a program can make it much more acceptable and certainly a lot more fun. **E**

Modifying the program. — Figure One

```

110 IF % = 111 THEN POKE 2281 INT (RND)*160
120 IF % = 122 THEN X = X-2
130 IF % = 109 THEN X = X+2
140 IF % = 106 THEN Y = Y-2
150 IF % = 124 THEN Y = Y+2
160 IF % = 132 THEN X = X-2 Y = Y-2
170 IF % = 124 THEN X = X+2 Y = Y-2
180 IF % = 121 THEN X = X-2 Y = Y+2
190 IF % = 117 THEN X = X+2 Y = Y+2
695 POKE 1000 POKE 1017

```

Variable list

J	Joystick address (1000)
M	Memory address for data (2 Data)
V%	Value chip address
F	Sprite pattern
Dir%	Dir array
Dir (12)	Dir information array
SL	Sprite Point
D%	Dir for sprite
TA	Total of Dir (12) array
X	Sprite X position
Y	Sprite Y position
Dir%	Screen position for juggle data
Dir (12)	Dir movement
Z	Pixel value for juggle data
Q	Frame loop
CC	Colour value
S	Dir (12) array for 12 Dir



Joystick for use with program

[illegible]

```

700 POKE2048,200
710 DOSUB5000
720 GOTO500
4997 REM *****
4998 REM * UPDATE SCREEN DISPLAY *
4999 REM *****
5000 TR=0 FORA=1TO8:BIT(A)=PEEK(J)AND 100: TR=TR+BIT(A): NEXTA
5010 PRINT"*****",
5020 FORA=1TO8:IFBIT(A)<0THENPRINT"### 0H": GOTO5040
5030 PRINT"####",
5040 NEXTA:PRINT:PRINT"*****",
5050 FORA=1TO8:IFBIT(A)<0THENPRINT"### 1": GOTO5070
5060 PRINT"### 0",
5070 NEXTA
5080 PRINT:PRINT"###:PRINTTRAK24)"
5090 RETURN
5997 REM *****
5998 REM * ANIMATE JUJOLIN'S ITEMS *
5999 REM *****
6000 FORA=8TO21:IFA=1:THENFORB=1TO10:NEXT
6010:IF1(A)=1:THENPOKEBALL(CO,2):GOTO6030
6020:POKEBALL(CO,32)
6030:NEXTA
6040:RETURN
19997 REM *****
19998 REM * DECIMAL DATA *
19999 REM *****
20000 DATA120,64,32,16,0,4,2,1
29997 REM *****
29998 REM * SPRITE DATA *
29999 REM *****
30000 DATA00
30001 DATA0,20,0,0,40,0,0
30002 DATA255,0,0,20,0,0,20
30003 DATA0,0,255,0,10,255,192
30004 DATA127,255,240,0,239,60,0
30005 DATA255,13,0,239,0,0,255
30006 DATA0,0,05,0,0,05,0
30007 DATA0,05,0,1,05,04,1
30008 DATA65,64,1,65,64,1,65
30009 DATA64,1,65,64,10,130,160,0
30011 DATA0,20,0,0,40,0,0
30012 DATA255,0,0,20,0,0,20
30013 DATA0,0,255,0,3,239,240
30014 DATA15,255,253,40,239,0,112
30015 DATA255,0,0,239,0,0,255
30016 DATA0,0,05,0,0,05,0
30017 DATA0,05,0,1,65,64,1
30018 DATA65,64,1,65,64,1,65
30019 DATA64,1,65,64,10,130,160,0
35997 REM *****
35998 REM * SCREEN POSITIONS FOR ITEMS *
35999 REM *****
36000 DATA1004,1044,1004,1764,1723,1602,1720,1759,1799,1039,1079
36010 DATA1004,1044,1004,1764,1723,1602,1720,1759,1799,1039,1079
36017 REM *****
36018 REM * DATA FOR JUJOLINO SEQUENCE *
36019 REM *****
36020 DATA1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0,1,0

```


gators and veterans, look out to become a major force in the industry. **Breaker** is a terrific title graphically, and the controls are not too hard, but it's fast and fun and had me hooked pretty quickly. Loaded at 400,000, it's just a variant of Galaxian, in which alien ships invade you on light paths, and the occasional Masterdip has to be dealt with using special torpedoes. Fortunately I have. I had the urge to look at Breaker's tapestry, which went for a good sign.

Program: Breaker, Ltd.
Supplier: Addictive
Price: £9.95
Graphics: *****
Sound: *****
Control: *****

Son of Patrol



FOR **SON OF PATROL** is a refined Defender-derived shoot 'em up, and FPD is a classy-souped programmed again by Silver Line.

Try your Palace NTOL pin over the beautifully detailed shoot 'em up of pyromaniacs, bomb cars, rocket barrels and burning out choppers — launch rockets forward or down at incoming helicopters before they land you, or land to land unsavoury employment. Watch your radar display and knock out radar sensors, landing on your pad to refuel on gas to reach the next wave of battles.

Great musical score by Dave Lee, and the best explosions you've ever seen. Don't forget FPD is on offer at £2.95 at the moment, as are many other 64 and Vc

games from Page 1.

Another one for the shopping basket type.

Program: Palace Patrol 1, Ltd.
Supplier: Vapin, 24 Vernon Yard, Portobello Road, London.
Price: £7.95
Graphics: *****
Sound: *****
Control: *****

Knockout



COMPARED to other racing games, **Knockout** demands far more Vc 20 control, but **Raptor Punch** will keep you very happy for the moment. It's fast and is particularly good, but Raptor can't be chosen.

This joystick-only game places you in a decorated dragon, around which you move controlling light (it's not unlimited). Search for the hidden treasure chest, avoid spinning mines, bullet firing dragons and dropper eggs. You can run your rounds through with your finger when a coin sounds, otherwise you're in trouble. You can also throw knives, but these have the habit of coming back to hit you.

With 99 levels and a time limit to play against, **Raptor Punch** isn't very taxing to look at, but could offer many hours of play to the dedicated.

Program: Raptor Punch, unproduced Vc.
Supplier: Commodore, Widdow North Ltd Ltd, Colby.
Price: £4.95
Graphics: *****
Sound: *****
Control: *****

Living on the ceiling



EASILY the best thing to emerge from **Edinburgh**, **Easy Jones** is 17 games in one. You play the spinnings Jones, who moves around the three floors of a hotel using levers, avoiding the danger of the phone of the previous manager, and a

room. There are 18 rooms to hide in, and — here's the nifty part — if all of them contain game machines which you can play to add to your score. Hanging from **Easy Jones** is **Wild Waters**, with marvellous sports animation and astounding musical score. **On Red Ballroom**, **Red To Go**, and the mini-games are all perfectly playable in themselves, and make **Easy Jones** one of the most original and value-for-money programs for the 64 yet to emerge. Just one question — why does it play **Living on the Ceiling** every time you take it to the point?

Buy this one!
Program: Easy Jones, 64.
Supplier: Terminal, Derby House, Derby Street, Derby.
Price: £9.95
Graphics: *****
Sound: *****
Control: *****

Exam time



WHILE doubtful about the value of some educational software — after all, it's the syllabus that you should be concentrating on — I must admit that the Longman's Exam Revision series looks good for its subjects covered include Chemistry, Physics, Maths and Computer Studies in CSE and O Level.

The **Computer Studies** program contains five sections, the first four covering major problem areas and the last being a database which is intended to aid revision. Each program is menu-driven and illustrates the topics with interesting graphics.
Program: Longman's Exam Software, 64.
Supplier: Longman's, Longman House, East Hill, Harlow, Essex.
Price: TBA.
Graphics: *****
Sound: N/A.
Control: N/A.

Not serious!



IF you aren't keen able to play tennis, I don't think you'll find my performance with **Wimbledon** all too inspired either try again. Although the graphics and sound effects are nice, it's so good if you can't get the ball over the net, and no matter how hard I studied the instructions I couldn't work out where I was going wrong. Pass the bucket water.

Program: Wimbledon, 64.
Supplier: Martin Software, Southern & Technology Centre, Bessmer Drive, Stevenage, Herts.
Price: £9.95
Graphics: *****
Sound: *****
Control: *****

Still more computers — and you're now entering to SWFT 8473, Commodore Horizon, 12/13 Little Newport Street, London WC2.

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Dr Watson solves the 64 machine code

Chris Whitcombe educates himself in Machine Code with two teaching packages, and tries out a basic compiler

ANYONE trying to teach me Machine Code would have an impossible task. My friends who understood this strange language say "you've got to forget all about BASIC and think in M/C and Hexa-damned!" I'm afraid that I find it difficult to follow this advice, good as it may be. I don't even think in hexa or yet! I still believe in Frits and orders, and half-cocoals.

Unfortunately, BASIC is not good enough if you want your basic functions to move about the screen at something more than a snail's pace, so I suppose that I am just going to have to knockle down to some more study.

Despite my pessimistic thoughts are not quite as black as they may at first seem. There is plenty of help about in the form of books and learning packages.

One such offering comes from Honey-Bolt's Dr Watson computer learning series, and is entitled *Beginner's Assembly Language Programming for the Cliflet*. The package contains a book and a cassette. On the tape is a full 6502 assembler, a Machine Language Monitor and a Binary/Hexadecimal/BCD utilising program. The introduction to the book explains that no pre-existing knowledge of Assembly is required. I hope this is the case!

Let's study

Chapter 1 starts in a fairly friendly way using short programs to explain a few of the variations that you will need to get started. You are then shown how to List what you have typed in, using the Assembler, and then displays a table showing the Assembly program and what it looks like in Machine Code. More commands are then added to the program and explained in some detail, along with a diagram showing the relationship between the Assembler, A10, X and Y registers. Like most of the chapters in the book, this one is liberally sprinkled with cartoons throughout. "Just like being back at school?" I bet you say. But with these, nobody will know if you cheat. except you. Actually, this is just a good idea, as they do help you to discover whether or not you really have understood what you thought you had understood. Having learnt how to manipulate information into and out of the Assembler and Register, chapter 2 shows how to jump around a

program — a sort of machine code DOSUB.

The assembler explains about the Program Counter, Unconditional jumps and a few more commands to help you on your way. The chapter ends with a short section on flags. I think I'm going to have to read this bit again, and do the exercises at the end. The next chapter starts by explaining more instructions on computing information to the screen. The examples (necessarily) run so fast that you need some people! This naturally leads me to a section about timing loops. In these, nothing ever happens fast enough. In Machine Code, it seems, the reverse is true. There are different modes of addressing in M/C and these are all explained at some length at the end of this chapter.

Logic!

Chapter 4 starts with Logical operators and continues on into the use of Hexa decimal numbers. Binary Coded Decimal, Bit Manipulation and Binary Division and Multiplication. Oups! Half way through the book and things are starting to get heavy. We are now up to Advanced functions of the Assembler including the use of Labels. Memory Labels and Macro instructions. As in all the previous, these commands are explained at great length and you should be able to get the hang of it if you don't take a too fast! The chapter ends with an explanation on how to control your Machine Code programs into Data statements. No worries here — the Assembler does all the hard work for you. If you don't want to "mess about" with Assembly Language but feel worried that you would prefer to work directly in M/C, then chapter 6 is for you. This details the functions of the Machine Language Monitor (an option of the Assembler) showing how to enter or record programs by using Hex values straight into memory locations (BCD's). The chapter continues with sections on protecting M/C in memory, how to Save and Load using the Monitor and Register Display and De-writing.

If you have got this far in the book and understood it all, then the next couple of chapters should hold no fears for you whatsoever. We are told that, after having learnt how to do things the hard way, some functions can be done easily and quickly in

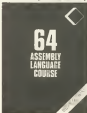
this (possibly) yet-to-come by using the 64's built in spreadsheet. More of the more functions, other parts. We promise it is possible that it can be readily done by using this book.

I haven't yet been able to use Interrupts and how to interrupt a task. But the author states that, using the new of the chapter is detailed in regard numbers. OverFlow, Floating point numbers and logical instructions that could be useful when using the above mentioned in Machine Code programs.

Labels

Chapter 5 has the reference to all the exercises set throughout the book. Even Appendix 1 has exercises in it! However, it does also explain in great detail about Binary, BCD and Hexa decimal. The last 2 sections of the book are appendices of everything you need to know to put your completed M/C skills to the test. All the 6502 instructions are listed along with the number of bytes each instruction uses and how many clock cycles it takes to operate. The size of the various flags is also shown for each operation and Truth tables are included where appropriate. A memory map lists all the Labels along with their locations and a brief description of what they do. There are also tables for the Base ROM and Kernel ROM. The last section details the Kernel routines and their use.

The package is well presented and the book is fairly easy to follow considering the subject matter. I particularly like the way in which the first couple of chapters are not too overwhelming and lead you gently into the rest of the book. So many authors try to impress you with how clever they are, and end up by only confusing you, instead of helping you to understand what they perhaps consider elementary. What you really want to know is, of course, have I now mastered Machine Code? Well no, I haven't. But I do feel that, with another couple of reads through the book (and a little less cheating at the manual) I should be well on the way to learning Assembly to completion, a professional package will write it and I hope it is available. ▶



Dr M. Jones with Whitcombe



on the tape, and when it finds it, it will load it in and do the business. The Compiler will make 2 passes through the source file while constantly displaying the number of the line being worked upon. When the second pass is complete the user is prompted to insert the tape that is to hold the new version of the program and, if you so command, a copy of the "Run Time Library File" (which is a list of Assembly routines used by Compiled programs) which is needed to enable your set to Run the new high speed program that you have just created. But, looking at the bright side, the RTL file only needs to be entered on the computer's memory once, and then you can Run as many Compiled Programs as you like... as long as you don't switch off.

The Jetpack Compiler performs extensive checks whilst going about its business, and will report all errors found giving the relevant line number followed by an error code—a lot of which appear in the back of the book.

Loadlist

It is not unusual for CMM Basic to be extended using extra routines implemented by Assembly routines in ROM or RAM. Fortunately, the RTL Basic 64 has a special format which takes care of its needs. Also, compiled programs can use routine Machine Code instructions without any alteration.

The booklet claims that compiled programs CAN Run as to 25 times faster but also something between 2 and 15 times is more typical. A first package collection routine is included that reads very long files that can occur in programs with a lot of strings. Compiled programs, it says, normally occupy between 50% and 80% of the space of the original program. I am a couple of my own affairs through Jetpack, and they were certainly busy, although it is not easy to judge by how much. Whether or not a compiler is the answer to your programming problems, only you can decide but Jetpack could be well worth a look. I only wish that the complete manual came with the tape instead of it being an optional extra! As for me, I'm sticking with Dr. Watson.

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4... and of 128 80 pinled value for memory that.

Another package along similar lines is the Dr. Watson in the Complete Machine Code Tutor from New Generation Software. This uses a different approach however and, instead of having a textbook and Assembly tape, this offering uses 2 cassettes and what might be, generically, termed a booklet. While loading the first tape into a browser through the "comprehensive reference manual" shows it to be really an a directory of what goes on the tapes along with a few pertinent key words of which appear within the cassette tape anyway, thus making the pamphlet more or less redundant.

Loadlist

The 4 sides of tape are filled with images and cartoons, the books being pages of text about all the various instructions and addressing modes used in Assembly Language. The cartoons, unlike the Dr. Watson files, are not in the form of a text, but are more an example program listing. By pressing the Machine key, the course is stepped through the program line by line, and the changes made to the contents of the registers (R0, etc.) are displayed in table form along with a 1 line explanation of what is happening. Although you can hide the program and see the different values at the registers, you cannot actually edit it in any way at all. This is because the package does not contain an Assembly program—it is only an Assembly simulator. This means that what you have here is really a textbook on cassette. As most of us are unable to carry out 64's and TV's around with us, it does not seem to have any advantage over the real thing! As such, I'm not sure who it is supposed to appeal to. The information contained in the package is sparse, to say the least, and it does not include an Assembly... in 128-80 it's not cheap, give me a good book anyway.

If you find suitable, or something, to get down to some serious study in your quest to master Machine Code, then there is a

possible alternative:

You might like to try a Basic Compiler. The Jetpack RTL Basic is just such an animal and it promises to improve your Basic programs by making them run faster. RTL Basic 64 is available on tape at £14.95 or disk at £29.95, the latter version having the usual advantages of speed, larger program handling and other additional features.

Long

This is quite a long program, so while the tape is loading, you will have plenty of time to study the leaflet that accompanies the cassette. In doing so at the back of the book you can supply separately the full Compiler manual which describes the functions of both the tape and disk compilers in more detail. It doesn't say whether or not you have to pay for it! It also states that a copy of the tape version may upgrade to the disk compiler—but again, no mention of money. After the program is loaded, you are prompted from the screen to enter the name of the Basic program that you want compiled, and the computer will then look for that program



Figure 1: 128 Basic — a different look!

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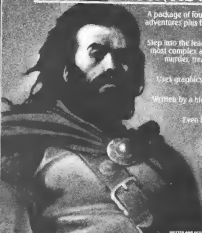


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623 DATR200.141.10.200.200.05.195.200
624 DATR20.204.0.200.190.102.0.100
625 DATR0.100.04.105.201.1.200.10
626 DATR254.13.200.100.10.200.201.200
627 DATR144.0.100.0.100.04.195.200
628 DATR202.200.192.2.200.207.173.20
629 DATR200.141.201.3.173.201.3.41
630 DATR1.240.0.100.1.141.204.0
631 DATR04.76.05.193.1.92.204.204
632 DATR170.201.3.41.4.240.20.170
633 DATR201.3.41.0.240.0.100.0
634 DATR06.40.193.173.201.3.41.10
635 DATR240.5.100.2.76.40.190.170
636 DATR201.3.41.32.200.0.100.4
637 DATR06.40.193.76.72.190.100.0
638 DATR100.0.200.100.70.100.7.200
639 DATR107.100.141.200.3.100.0.141
640 DATR4.200.100.100.141.5.200.90
641 DATR102.210.100.200.200.200.200.200
642 DATR200.240.76.100.103.173.201.0
643 DATR41.2.240.104.76.240.192.100
644 DATR100.141.4.200.103.200.141.5
645 DATR200.76.173.192.96.173.201.0
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652 DATR05.100.100.200.141.15.200.36
653 DATR76.100.103.100.0.141.00.100
654 DATR04.100.0.141.4.212.100.00
655 DATR141.0.212.100.20.141.1.212
656 DATR100.120.141.4.212.96.200.200
657 DATR100.173.202.192.201.10.144.20
658 DATR100.0.141.202.192.200.200.192
659 DATR170.200.192.102.0.100.200.192
660 DATR107.0.4.200.200.204.0.200
661 DATR244.76.0.192.0.200.0.200
662 FORI=GT0001 READR FORI12000=1.0 NEXT
663 FORI=GT0400 READR FORI400102=1.0 NEXT
664 RETURN

```



**Mr. Pettigrew has been keeping
a few secrets from us.**



SHARDS

THE PETTIGREW CHRONICLES

COMMODORE 64, SPECTRUM 64K

November 1984 Cassiniere Press 45

Stop the Express

If you have not already guessed from its name, the 1241 Express is a little "think key" which allows you much quicker access to your 1241 disk drive.

With this pocket-size 64 can access and load files from the 1241 at about twice the normal speed. This does you from the two- or three minutes taken to load large programs or files. The 1241 Express is marketed by Ram Electronics, and costs \$29.95.

For your money you are supplied with a cartridge which plugs into the 64's cartridge port, and a short manual (8 pages) to aid installation and explain use of the cartridge.

Before you can use the 1241 Express it is necessary to connect two wires from the cartridge, to two chips inside the 64. This means that the lid must be taken off the 64, which could void your warranty, so be warned!

No hesitation

Having removed the lid on my 64 many times, there was no hesitation at the prospect of more prodding around inside. The two wires are labelled 4218 and 4214, indicating the chips that the wires must be connected to. They both have a small gap on the end of the wire so that the connection is secure, but easily removable. The wire marked 4218 is connected to pin 38 of the processor, and the wire marked 4214 is connected to pin 13 of the chip marked U104 (but the chip itself is not marked U114, it is labelled on the board beside the chip). It is advisable to put the

wire through the back of the 64 so that it can be closed properly!

There's no problem if the wires are connected in the wrong pins; the cartridge simply won't work and you will have to check the connections.

When you power up the 64 with the 1241 Express properly installed, you'll see three bars to the power up message instead of two. This means the board is working. The product name and copyright message. The screen of RAM is not affected; there are still 64KB bytes available.

The manual is the user really looking, as is so often the case. However, this is a production version. The manual is eight pages long, and the presentation is not nearly as professional as the pocket itself. The eight pages cover the installation of the cartridge, the operating instructions, functions of the cartridge, working with other peripherals and very few programmers' notes.

There could have been a great deal more explanation of the cartridge in general, and the problems that might occur in using it with other peripherals. A few demo programs with documentation would not have gone amiss, and certainly more information for programmers wishing to make extensive use of the cartridge and its facilities is a must.

Unlike the manual, using the cartridge is very simple and smooth. When the 64 is powered up with the 1241 Express installed, the two function keys F1 and F2 are set to toggle between fast and slow mode. In other words the normal disk access time may be used with the cartridge at place by

pressing the 'CTRL' key and the 'F1' together; the screen will flash once quickly.

To get back to fast mode simply press 'CTRL' and 'F1' together; again the screen will flash once, although this operation takes a little longer. Holding down the 'SHIFT' key and pressing 'RUN-STOP' will load and run the first program on disk. The cartridge changes the default device to disk, saving the need for the 'D' file (as simply be loaded in the file `LOAD=>C:\RAMDISK\Continue`).

There is no need to enter the device number or drive the quarter, and the usual abbreviations are accepted.

Besttest results

Ram Electronics claims up to three to four times the usual access time. This is more like twice the speed on average. Here are some of the results from the benchmarks, giving normal times first then times with the cartridge.

Loading 10K program: 1 min. 24 sec. / 18 sec.

Saving 10K program: 1 min. 31 sec. / 1 min. 4 sec.

Loading 14K file: 1 min. 52 sec. / 1 min. 4 sec. (Press key 5 first)

Saving 14K file: 1 min. 32 sec. / 1 min. 4 sec. (Press key 5 first)

These tests are all approximate, but even so they do not actually amount to three times the normal speed. They do however make a huge improvement, particularly with normal programs, but even with files loaded and saved from a word processor. The 1241 Express will work with any



Stamps, Paperclip, and, I am informed, most other well loaded word processors. From the tests, disk access time is in general reduced by half.

Using other software such as editors and those programs does not have any adverse effects. Even if a program does conflict, it is often possible to load and run it by switching to normal mode.

The 1541 actually objects to opening the disk on the screen while the disk is accessed, but not so with the cartridge inserted. You can display updates and still have access to the disk.

The cartridge reverses use of the drive buffers, reducing the number of files OPEN at any one time from 1 sequential, or 1 sequential and 8 relative files, to 2 sequential files or 1 relative file, or 1 file mode.

An RS-232 module may be used with the cartridge. This allows serial downloading of programs. However, if you wish to have more than one device connected to the 64's serial port while using the 1541 Express, you will have problems, as it will only accept one. An anyone with a 1541 and a printer connected to the serial bus or two 1541's will not be able to use the cartridge with more than one of these devices.

Ram says it is just about to market a cheap cable which will allow you to have two drives, or a printer and one drive, connected while using the cartridge in fast mode. The cable will also have some other features — as yet no details, we shall have to wait and see.

The cartridge will give you the extra



features described before by 'SHIFT RELY'—STOP) and default to disk, whether in fast or normal mode. Depending on what pointer you set using and how it is connected, the cartridge may work in slow mode with your printer. Two single drives may be connected with the cartridge inserted, but only accessed in slow mode.

The code for the cartridge is reversible, the normal cartridge space is 15000 to 19000 hex, but upon examination there was nothing there. The space that normally occupies the ASCII code for the power up message has some no sense code and the area from 15000 hex onwards will not download. So for those who are curious, this should provide some challenges!

In conclusion, it's a shame about the manual, it could have contained a lot more information and the presentation could

have been better. The other drawback is of course the lack of a cartridge port when using the 1541 Express, any cartridge you normally use, or wish to use, cannot be connected. It means the only way around this is to buy an expansion board. Given that I am not sure if they would work together — perhaps Ram Electronics will clarify this in the near future.

The product is overall all it claims to be and saves a lot of time if you use your 64 and 1541 daily. The general standard of the product is very high and I have no hesitation in recommending it; in fact more reviewing the 1541 Express I have purchased one myself! It is one of those products that you just have to have in spite of the price! ■

Kevin Bergin

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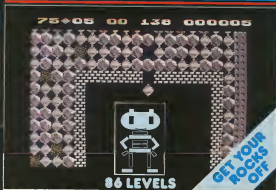
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Speak and spell with Currah's little chatterbox

David Fox strikes up a conversation with the Currah Speech 64 voice synthesizer

AS A PRELUDE to a full review of speech synthesis and voice-recognition hardware, which will appear in the New Year, this is a brief look at one of the most attractive speech synthesizers on the market — the Speech 64 from Currah.

Currah's Microspeech for the Sinclair Spectrum was highly praised, sold in thousands, and led to many software houses incorporating it into games. The Speech 64 is an improved version of the unit, and works on the same basic principles.

Human speech can be received, say, stored, and then played back as allophones. Rather than limit the range of a speech synthesizer by programming it to reproduce a small number of words, recorded digitally into PROMs — Programmable Read-Only Memory chips — Currah chose to synthesise allophones and leave it to the individual to combine these into whatever vocabulary was required. To be more clear, you can program Speech 64 to say anything you want it to, though it will sound fairly mechanical — but the odd to the few, I feel.

Advances

The Speech 64 plugs into the cartridge port and an DIN plug goes into the audio/video socket. Inserting UNIT will activate the system, which will print an additional copyright message on the screen.

The Speech 64 plugs into the cartridge port and its DIN plug goes into the audio/video socket. Inserting UNIT will activate the system, which will print an additional copyright message on the screen.

Any key pressed will then be "voiced" (remember to turn up your TV volume!).

One great advance incorporated into Speech 64 is that it can speak in a variety of voices — low or high, soft or without a filter.

Thus lets great games all for use it games, especially adventures where different characters could be given widely differing voices. Ray riding can be disabled with BEEP, though for clumsy programmers it could be a bonus. All voice selection commands can be incorporated into basic keys.

Allophones

There are two methods of capturing speech — in ordinary English (as for the

author key when language you required) preceded by a SANY command, or in allophone form, combining the 58 available allophones for every possible result.

The Speech 64's 100-to-speech converter is incredibly accurate, and nothing like a has been available for the Commodore before now. The unit's operating system even includes a "look-up table" which takes part of words with non-standard pronunciation like "though". Well, it is possible to make a pronounce many words odd, so this is where the allophone form comes in handy — though it takes a little getting used to.

Bugs

Let's try a little allophone composition. "Welcome to the David Foxes" would be stored allophonically as "welkum tu: d'foks" (dittoed pronounced as "foks"). Obvious when you look at it.

Spoken in the speech can be produced using standard pronunciation, and if you make an error — enter a non-existent allophone — you'll get an error message. Normal text and allophones can be mixed

in a SANY statement by enclosing the allophones in square brackets.

Upper case gives higher intonation, so in effect Speech 64 can produce four voices at different pitches. Clever programming can also reproduce different accents and dramatic tones.

Speech 64 doesn't slow down the execution of programs, since it includes a "buffer" where speech information is stored and released at a standard rate. If you STOP a program the buffer is composed — otherwise you might have 30 seconds of unwanted speech.

Examples

The comprehensive handbook claims that it's much harder to program Speech 64 to produce code than it is to BASIC. However, I doubt whether it will prove any difficult to experienced programmers. Full details are given of how to achieve m/c operation in a number of modes, and there's an example BASIC program — a revolving clock using the 64's internal TIG.

Attempts

All in all the four voices, 100-to-speech conversion and low price — £29.95 — of the Speech 64 make it a real winner for serious owners. Other attempts by various companies, including Commodore itself, to produce speech synthesizers, have failed due to a lack of software support and marketing know-how. Currah, it seems, will be making no such mistakes. Already negotiations are being carried out with a number of big software companies to produce Speech 64-compatible games — Attridge's PC Pong should be the first one. If it's a success, it may well be the first of a long line of selling games which will exploit the capabilities of Currah's excellent product to the full. ■



Currah's Speech 64 — four voices, and not three as advertised

COMMODORE SOFTWARE FILE

Paralander

Paul Bateman of Bateman, Lockhart wrote this game for the 64.
PARALANDER is a two stage game. In

the first section you must load 80 paratroopers safely on the moving cable below. Use the fire button to drop a paratrooper from your bomber. Random crosswinds make this difficult.

In screen two you must maneuver your bomber with a fast machine, but you run into

a lot of fire if you collide with a thunderbolt. Reach the bottom of the screen without refueling or you'll die. 10 seconds max time, which decreases by 5 seconds on each attempt. Anytime in part 2. Type in an 81000 or you may encounter UNDEF'D STATEMENT errors.

```

10 V=0:Y=0:Z=50288:W=50281:U=0:V=0:W=0:Z=0:Y=0
20 GOTO 10000
30 PC=0:LD=00:LS=0
104 REM
105 W=150:Y=79:POKEV+20.1:POKEV+29.1:W=10:W=0
106 PRINT "CAB"
107 PRINT "*****"
114 POKE2040:182:POKE20:1:170:POKE2042:154:POKE2043:194:POKE2044:194:POKE2045:19
4
115 POKE2046:195:RESTORE
120 FOR=0:TO=62:REPEAT:POKE12200+R:0:NEAT
122 FOR=0:TO=62:REPEAT:POKE12600+R:0:NEAT
124 FOR=0:TO=62:REPEAT:POKE13000+R:0:NEAT
126 FOR=0:TO=62:REPEAT:POKE13400+R:0:NEAT
128 FOR=0:TO=62:REPEAT:POKE13800+R:0:NEAT
130 FOR=0:TO=62:REPEAT:POKE14200+R:0:NEAT
132 POKEV+40.3
140 POKEV+20.1:POKEV+20.1
150 FOR=0:TO=62:REPEAT:POKE14600+R:0:NEAT
160 R3=0:R4=0:R5=0:R6=0:R7=0:R8=0:R9=0:R10=0:R11=0:R12=0:R13=0:R14=0:R15=0:R16=0:R17=0:R18=0:R19=0:R20=0:R21=0:R22=0:R23=0:R24=0:R25=0:R26=0:R27=0:R28=0:R29=0:R30=0:R31=0:R32=0:R33=0:R34=0:R35=0:R36=0:R37=0:R38=0:R39=0:R40=0:R41=0:R42=0:R43=0:R44=0:R45=0:R46=0:R47=0:R48=0:R49=0:R50=0:R51=0:R52=0:R53=0:R54=0:R55=0:R56=0:R57=0:R58=0:R59=0:R60=0:R61=0:R62=0:R63=0:R64=0:R65=0:R66=0:R67=0:R68=0:R69=0:R70=0:R71=0:R72=0:R73=0:R74=0:R75=0:R76=0:R77=0:R78=0:R79=0:R80=0:R81=0:R82=0:R83=0:R84=0:R85=0:R86=0:R87=0:R88=0:R89=0:R90=0:R91=0:R92=0:R93=0:R94=0:R95=0:R96=0:R97=0:R98=0:R99=0
170 R0=0:R1=0:R2=0:R3=0:R4=0:R5=0:R6=0:R7=0:R8=0:R9=0:R10=0:R11=0:R12=0:R13=0:R14=0:R15=0:R16=0:R17=0:R18=0:R19=0:R20=0:R21=0:R22=0:R23=0:R24=0:R25=0:R26=0:R27=0:R28=0:R29=0:R30=0:R31=0:R32=0:R33=0:R34=0:R35=0:R36=0:R37=0:R38=0:R39=0:R40=0:R41=0:R42=0:R43=0:R44=0:R45=0:R46=0:R47=0:R48=0:R49=0:R50=0:R51=0:R52=0:R53=0:R54=0:R55=0:R56=0:R57=0:R58=0:R59=0:R60=0:R61=0:R62=0:R63=0:R64=0:R65=0:R66=0:R67=0:R68=0:R69=0:R70=0:R71=0:R72=0:R73=0:R74=0:R75=0:R76=0:R77=0:R78=0:R79=0:R80=0:R81=0:R82=0:R83=0:R84=0:R85=0:R86=0:R87=0:R88=0:R89=0:R90=0:R91=0:R92=0:R93=0:R94=0:R95=0:R96=0:R97=0:R98=0:R99=0
180 POKEV+0.1:POKEV+1.1:Y
190 R0=0:R1=0:R2=0:R3=0:R4=0:R5=0:R6=0:R7=0:R8=0:R9=0:R10=0:R11=0:R12=0:R13=0:R14=0:R15=0:R16=0:R17=0:R18=0:R19=0:R20=0:R21=0:R22=0:R23=0:R24=0:R25=0:R26=0:R27=0:R28=0:R29=0:R30=0:R31=0:R32=0:R33=0:R34=0:R35=0:R36=0:R37=0:R38=0:R39=0:R40=0:R41=0:R42=0:R43=0:R44=0:R45=0:R46=0:R47=0:R48=0:R49=0:R50=0:R51=0:R52=0:R53=0:R54=0:R55=0:R56=0:R57=0:R58=0:R59=0:R60=0:R61=0:R62=0:R63=0:R64=0:R65=0:R66=0:R67=0:R68=0:R69=0:R70=0:R71=0:R72=0:R73=0:R74=0:R75=0:R76=0:R77=0:R78=0:R79=0:R80=0:R81=0:R82=0:R83=0:R84=0:R85=0:R86=0:R87=0:R88=0:R89=0:R90=0:R91=0:R92=0:R93=0:R94=0:R95=0:R96=0:R97=0:R98=0:R99=0
200 POKEV+0.1:POKEV+1.1:Y
210 POKEV+0.1:POKEV+1.1:Y
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3D COMPUTERS

THE HOME COMPUTER REVOLUTION

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	1980	1985	1990	1995	2000	2005	2010	2015	2020
Population	76.5	80.5	84.5	88.5	92.5	96.5	100.5	104.5	108.5
GDP (constant prices)	1.2	1.8	2.5	3.2	4.0	4.8	5.5	6.2	7.0
Per capita GDP	15.8	22.4	30.1	36.3	43.3	50.0	55.0	60.0	64.0
Life expectancy at birth	65.0	68.0	71.0	74.0	77.0	80.0	83.0	86.0	89.0
Infant mortality rate	120.0	100.0	80.0	60.0	40.0	25.0	15.0	10.0	7.0
Urban population (%)	35.0	40.0	45.0	50.0	55.0	60.0	65.0	70.0	75.0
Rural population (%)	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0
Employment in agriculture (%)	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	7.0
Unemployment rate (%)	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0
Government expenditure as % of GDP	15.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0
Private consumption as % of GDP	55.0	58.0	60.0	62.0	64.0	66.0	68.0	70.0	72.0
Investment as % of GDP	20.0	22.0	24.0	26.0	28.0	30.0	32.0	34.0	36.0
Net capital formation as % of GDP	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0	34.0
Current account balance as % of GDP	-2.0	-3.0	-4.0	-5.0	-6.0	-7.0	-8.0	-9.0	-10.0
Foreign direct investment as % of GDP	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
Official development assistance as % of GDP	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Exports as % of GDP	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0
Imports as % of GDP	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Trade balance as % of GDP	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Public debt as % of GDP	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0
Central government revenue as % of GDP	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0
Central government expenditure as % of GDP	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0
Fiscal deficit as % of GDP	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Monetary growth rate (%)	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0
Inflation rate (%)	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0
Interest rate (%)	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0
Savings rate (%)	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0
Consumption rate (%)	85.0	84.0	83.0	82.0	81.0	80.0	79.0	78.0	77.0
Investment rate (%)	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0
Capital stock as % of GDP	100.0	105.0	110.0	115.0	120.0	125.0	130.0	135.0	140.0
Human capital index	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
Healthcare expenditure as % of GDP	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
Education expenditure as % of GDP	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6
Research and development expenditure as % of GDP	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
Environmental protection expenditure as % of GDP	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Corruption perception index	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
Gender inequality index	0.5	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.0
Income inequality index	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Trust index	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
Civil liberties index	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Political rights index	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Economic freedom index	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Business start-up cost index	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0

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The Adventure for Children



Help Henry Dandy and study what Henry Dandy characters in the adventure. This new reference guide, by Jeff Rogers, has been written for the C64 and especially for children aged 10-12. It's a fun, funny, comic, that reads for many locations and contains current listings.

Ask at your local stockist of C64 software or order on the form below

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Tel: (01223) 511199

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Address _____

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THIS PROGRAM uses the graphics facilities of the Super Nintendo to create a collection of classes.

On RUPping the slide page appears. Press any key to continue. The graphic computer will then start to be shown. The

Andrew Tilly from Knowledge made the program for May with Susan Alexander.

Lock of description

Book: *Commanders of Games*
Author: Kevin Beggs
Publisher: Dorland
Cost: £5.95

Reviewer: C. Whitcombe

This is a book of 30 job games — some games, some puzzles. Each is presented as a listing with comments about how the program works in the same fashion that can be seen in many of the computer magazines, eg *Let's Go* — *Let's Go* "Get up, variables!" While this format may be acceptable in some instances, I think that a book written along these lines should be more descriptive. In some ways, as this book, large numbers of the program are completely ignored.

Amongst the offerings are a Snake game, Draughts, Chess, and Hangman and the obligatory "Go to the Moon". The authors are so much excited by their graphics, block graphs, code colour, user hints and tape words.

As one of my parents is blind, I was pleased to see a program which allows the keyboard to be used to play games. One is also able to change most of the sound parameters. But the result was disappointing. Also, the program will not work as a stand-alone program; the CPM 86 cannot handle a program file of 88 characters.

But Kevin Beggs explains that the program will work if characters are entered in all lines greater than 88 characters.

At £5.95 this represents about 50¢ a program. For that sort of money you wouldn't expect too much. For anyone wanting good games, you would do better spending the money on the "real thing" and anyone willing to learn some things about programming would get better value and gain as much knowledge from half a dozen computer magazines. Sorry.

Structured programs

Book: *Survivor Plus*
Commanders of Games
Author: Philip Williams
Publisher: Conway

Williams House

Cost: £3.95

Reviewer: Phil Bowser

THESE 1015 little teaching statements appear on the cover of this book which diverges from an otherwise excellent volume. The first of these is the title, as the last sentence very like which would not apply equally well to almost any other basic computer. The only specific reference to *Commanders of Games* is in the appendix, which includes brief instructions on handling CPM programs and on using the function keys in Basic programs.

The second and more glaring

lack occurs in the back-cover blurb, which claims that the book "makes full use of the machine's sound and graphic capabilities". In fact the book makes no attempt whatever to do either. The *Plus* command is not even mentioned. So, what does the book try to do?

Its aim is to teach the beginner structured Basic programming and good programming habits, and this is achieved very well. It is clear and concise, working through all the fundamental Basic commands logically, with use of flow charts, and building up to an elegant listing for a Morris' Imperial conversion

program. Finally, it contains some examples on condition and makes brief mention of arrays and other commands.

The style of the book is simple, without being dull, and avoids the pitfall of treating the reader as if it was halfway to sleep. Philip Williams has provided a thorough foundation for the person who wishes to learn to program properly. He has set out to provide yet another adequate for *Commanders of Games*.

The book is attractively produced and represents excellent value for money at £3.95.

Vic20 giant book of games lives up to its title

Book: *Giant Book of Games for Your VIC20*
Author: P. Harpell, A. Bush and A. Young
Publisher: Fontana
Price: £7.95

Reviewer: David Shepherdson

THE excellent book contains 41 programs for the unexpanded Vic20 or for the expanded and expanded for a Vic with Super Expander and Printer/Floppy. All the programs are accompanied by an explanation book of how to enter and how to play at each item.

They are all changed from a 1024 Printer/Floppy so all can use in real and enter. Some include Machine Code routines and User Defined Graphics they range from simple games like "Guess the Animal" type to more than two-part type "Dungeon King". There are adventures and strategy games and a few utility programs like Big Letters, Type Patterns and Print. For the +128 Ks, some there are three big games: one is a War game reminiscent of *War*, *Flame Wars*, a Kingdom type survival game, *Farmer Jack II*, and *3D Tic-Tac-Toe*, and the Vic plays a very good game.

There is also a chapter on LDCs which gives a very clear explanation on how to build them and use them. The authors themselves give you ideas on how to adapt the programs within the book, also there is a section on games you might like to consider writing a computer program for, including reading and a library. Not the usual type where the

various characters are listed, but one where definitions are given. For instance, had you ever heard of the art "Well", we use the definition system 110, computer use library 12 and the 110 and should be a number 111 system using base 11.

The book itself is well

bound, well thought out and I would recommend it for anyone who enjoys game playing and programming on the Vic. You will have fun running the programs and using how some other could be used in your own program. Well worth the price.



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WIREIMAGE.COM MAGAZINE 84

"Superb high resolution with smooth scrolling, this program should give you plenty to think about!"
MIND ADVENTURES MAG 78

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FUTURBLACK (JANU 1984) 84

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to 200X, and comes complete with four and 30mm eyepieces, a Barlow lens, a sighting scope and diagonal prism and an adjustable tripod with bag.

It's one of the successful Astral range which starts with the Astral 85 at £24.95, and goes up to the Astral 500 at £199.99. All you have to do is win a program for the Commodore 64 or Vic 20 (with any explanation which gives a graphic representation of the shape of Halley's comet around the sun, or of your artistic impression of the comet). Then complete the questionnaire to us apt and winning winner in 15 weeks or less. "I want to win an Astral telescope from Orion because..."

Elaine Sedgwick of 16 Ashdown Gardens, Worcester Park, Surrey, is planning a Commodore 64 version of the Spectrum program **Halley's Comet**, by Graham Barber and Astronomer Margaret Gawn.

For more information on the comet for the astronomy section of your local library or the Junior Astronomical Society c/o Paul Sutherland, 13 Danesh Road, Faversham, Kent.

Send your program on tape, together with your name and address and your completed

win breaker, to Orion Telescope Competition, Compendium Horizons, 10-13 Little Newport Street, London WC2R 3LL. Enclose a note if you'd like your tape returned.

The closing date is the last working day of November. Normal competition rules apply, and the winner will be announced in the January issue.



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strayed away and are lost in the bowels of the caves.

A wealthy university has asked him, while he's
clearing this mess up, to capture an elusive stone-
age cave rat.

What? You?

He just has to avoid the occasional poisonous
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ANSWER BACK

Relays and m/c

IS IT possible to obtain an interface for the Vic which will allow the control of simple battery-powered machines (counters, e.g. small DC motor), and will allow information to pass from the count to the computer? And where can I find an immediately back-up machine code for the Vic? P. Gales, Chelmsford

YES. IRE, 141, RUSSELL, from Manchester, which connects to the rear panel and produces a motor-controlled pulse max. 24 volts, 10 watts, 1 unit price, and a free volt supply current.

If you want to control motor applications, you will need an interface unit as well. A suitable introduction is made for only on the Vic in the Electric Motor Interface pack from Moore Ind. 5 Southdown, Bide Place, Dorset, Dorset.

Expander and modem

I HAVE A Vic 20 with a 16K switchable RAM pack, and would like to add a Super Expander 9018 then run at the same time as a two-side motherboard, or would I need a double-sided motherboard?

Also, is there a modem available for the Vic 20? And can you publish a listing for a good, long piece of music for the Vic? I am sure you have one hidden away somewhere. A. White, Haverhill, Norfolk

THE SUPER Expander consists of 32 K RAM plus 32 K ROM located at 16000-16711 (16000-16095), and is similar to other 32 expansion. You can use your 16K RAM pack as well, but if your available pack contains a 32 switch then you cannot use this option, because it will be in use the same time as the Super Expander.

On modems, simply through Internet, Club CB, Plymouth Trading Units, 8-10 Cornhill, London SE8, Tel 01-488 9947. Interfac's phone Vic 20 modem will cost about £50, but does not have Teletext support and will not access Personal or Message.

As for music on the Vic, there doesn't seem to be a book devoted to the subject, although many general programming books have sections on music, perhaps a reader can make a suggestion on this one?

Printer and plotter

I WISH TO share ideas on 1200 printer - plotter with my disk drive and 1600 K printer in this column? My main purpose in purchasing a 1200 is to print address labels, with the letters on the left. A 20-30 cm Southdown Type and River YES, it is possible, because the 1200 has a direct number of 4 and the 1600 is in direct 4. Your program should open a channel to the 1200 with my, DPT 56.6, to the 1600 with DPT 56.6, and then PRINT "A," Address label" and PRINT "A," Letter" will appear on the respective device.

If you are using a word processing program, then set the device numbers accordingly.

Loads of errors

SOMETIMES when loading a program from tape it stops with LOAD ERROR! per before loading. What is the FREE because of the error message - could it be possible to POKE the program number back into a, so that the computer thinks there is no load error and carries on loading the program? Jan Davidson, Antwerp

At Antwerp WHEN A program is saved to tape, you cannot use the by the system. On loading,

first one tape is loaded, then the second. The two are compared, and if there are any differences you get LOAD ERROR. (Remember the error message in the case of a corrupted tape will not help, since several parts of the program may be missing. However, the program may still RUN if the error is not significant. In this case, check if the end of tape position agree with the end of program position. X and Y should be identical in the following line: X = PEEK(160) + 160*PEEK(161) Y = PEEK(162) + 160*PEEK(163)

If the listing is complete, and does not finish with garbage, then you can enter the program.

Program generation

I HAVE A 65, and am trying to get it to generate its own programs. It's easy enough to get a 65 produce 10 lines by printing the lines on the screen then filling the keyboard buffer with RETURNs, then ending the program.

I can generate more lines by making the last "new line" a GOTO line, but the GOTO performs a CLR, losing the data in the screen and clear this is where I want the new program data. I cannot use this method in those any way of preventing the GOTO from performing a CLR after program stops, or any other way of allowing more than 10 lines of program generated? J. J. Hymel, Chester, Germany

IF YOU WANT the GOTO command that performs the CLEAR, but the addition of the new line to your program.

You can get around this problem by FORKING your data into an area of memory which is above PEEK, and then FORKING that area when the GOTO is implemented. The FORK will be in the original program, and this line could be replaced by the line containing the FORK, by making your first new line number the same as the number of the line containing the FORK.

You can use a counter location so that you can count the number of lines added, e.g. POKE ADDRESS + 1. The CLEAR cannot affect the area of memory above PEEK.

Random access

CAN YOU help me with a program which will generate random numbers, then to let me check the how many times each number has appeared? I have an unexpanded Vic, but will soon be getting a switchable 16K pack. A. Campbell, Antwerp

The following program will work on all Vics (as our Commodore computer) in K = ROM 16K-16M TO 32000. THE RANDOM NUMBER GENERATOR IS 2 = 0.5 + 0.5 * (RANDOM 16384) is a good practice to set variables before dimensioning arrays. This speeds execution. 20 DIM A(1 TO 32000) 25 = INT(RND(16384) + 1) 30 PRINT S, 35 T=T+A-1:REM this counts the number of times that S is calculated 40 NEXT S 45 PRINT "A" 50 PRINT "A" APPENDED " 200" TIMES 55 PRINT "ANY MORE?" 60 IF "N" 65 CLEAR IF A(S) < 0 70 A(S) = A(S) + 1 80 IF A(S) = 1 THEN A(S) = 0

The 80 M statement and line 70 need not be entered, and the screen why variables are set first in line 10 is that an 80 M variables are entered above the program first and before arrays, so that if an array variable is used before after 100 is executed then the entire array area is saved up in memory, in order to meet the variable in its correct position. This makes the program slower.

If you need help with a technical query or problem write to Jack Cohen, Commodore Software, 15-18 Little Newport Street, London WC2R 2LL

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Case 97	Case 98	Case 99	Case 100

CONCLUSIONS

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1. *Journal of the American Medical Association*, 2000; 284: 2689-2695.

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[illegible]

As you gaze out onto the beautiful, peaceful, sun-bathed scene of the mountains above the town, built at the base of Mount Hood, it is the unobscured, majestic and stark beauty of the forest that strikes the eye, the healthy condition of the rocky ridges above the



DO NOT WRITE IN THESE SPACES

[illegible]

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Finally, various public and alternative media, such as radio, have very important role. Forthright Radio, however, has total control, holds multiple international, public and business line channels, and fully runs show with comprehensive staff in all languages.

Journal: *Journal of Management Education*

COMMUNICATIONS - TELEPHONE

Powerful sword processes, flattened lobes - large leaf buffers
 both sides, variable lat. spread, narrow, dense, ramp, smooth
 leaf w/ small rigid points, drying: jet blue, multiple thin
 branching, joint aligned leaf etc. Fully grown: dense with some
 flattened w/ lat. spread, dense, dense

[illegible]

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... designed to illustrate a single mathematical rule, not a straightforward step.

Danger Mouse walks into 100 lock rooms with a number 100 written on a piece of paper which also has four columns, A, B, C and D.

Each room contains a number and directions to the next room. All numbers should be recorded in the nearest whole integer, and the answer appears in column D on every the final room.

All you have to do is work out the purpose of the mathematical calculation which the device illustrates.

When you've worked it out, complete the table below and send your entry with your name and address to Danger Mouse Competition, Commodore House, 12/13 Little Portland Street, London, W1P 9JH. It is due on 15th March - a last working day of creativity.

Among lucky winners will come two Danger Mouse books from Creative Sparks Books. Trouble is an arcade machine featuring all the 70 illustrations. Danger Mouse, Rambo, Garfield and Laidlaw Penfold is a mail-receivable magazine. Rambo plans to create a professional Danger Mouse.

The Black Porthul Chosen is a text-and graphics adventure which finds DM in a really sticky situation — but you can help him out of a jam!

So the top bracket, which must be completed in an apt, logical and amusing manner in 10 words or fewer in 1% time, to help Danger Mouse out of a sticky situation incident.

Manual competition rules apply.

The winners of the September Quackula competition are Sam Williams of Newcastle-upon-Tyne, Peter of Lincoln, David John Price of Chesham, Steve Skinner of Birmingham, William Sample of Oxford, Andrew Ogden of Dorset, Stephen Price of Buxley, Neil Hughes of Wigan, Connor Crowley of Galway, Richard Pike of Walsford, Robert Miller of Clapham, Andrew Randall of Clapham, Simon Harper of Barnford, Peter Donovan of Buxley, M. Hughes of Leeds, A.S. Prange of Rochester,

Creative Sparks presents

Danger Mouse (and Penfold)

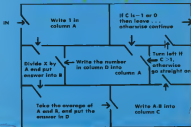
in a sticky situation! Help them out and you could win two new Commodore 64 games!

Conard of Penfold, Brian Clifton of Barnford, SC Mead of Walsford, and Tony Madland of Wigan.

Each will receive a package of the latest games from Quackula.

The winner of the September books competition is Colin Gray of Barnford, who will receive a complete set of Commodore 64 books from the publishers of Commodore Horizons.

The Mystery Maze





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Scene One - Stunning title page graphics give way to the first game scene as Alice falls into the rabbit's warren. Score points for collecting the objects to be found there - including keys to open doors, bottles to make her smaller, cakes to make her bigger.

Scene Two - Out in the garden the Cheshire cat looks on as Alice meets the pipe smoking caterpillar. Help her to catch the broad-and-butterflies and the smoking pipe lets (that change into) the bats used in the croquet game in the last scene!

Scene Three - Alice is a pawn in the chess game where her opponents are the Jabberwocky and Tweedledum and Tweedledee. Help her across the board by protecting her with your White Knight!

Scene Four - The most bizarre croquet game ever! Help Alice hit the balls through the playing card soldier hoops before the Queen of Hearts stomps on them!

Alice in Videoland is available for the Commodore 64 on disk - £12.95, and now on cassette - £8.95

Alice in Videoland features graphics created with the Royle Pix

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